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# MEDICO-CHIRURGICAL TRANSACTIONS.

PUBLISHED BY

THE ROYAL  
MEDICAL AND CHIRURGICAL SOCIETY  
OF  
LONDON.

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VOLUME THE THIRTY-FIFTH.

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LONDON:  
LONGMAN, BROWN, GREEN, AND LONGMANS,  
PATERNOSTER-ROW.

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1852.

C. AND J. ADLARD, PRINTERS, BARTHOLOMEW CLOSE.

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SECOND SERIES.

VOLUME THE SEVENTEENTH.



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1852.

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ROYAL  
MEDICAL AND CHIRURGICAL SOCIETY  
OF LONDON.

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THE QUEEN.

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ELECTED MARCH 1, 1852.

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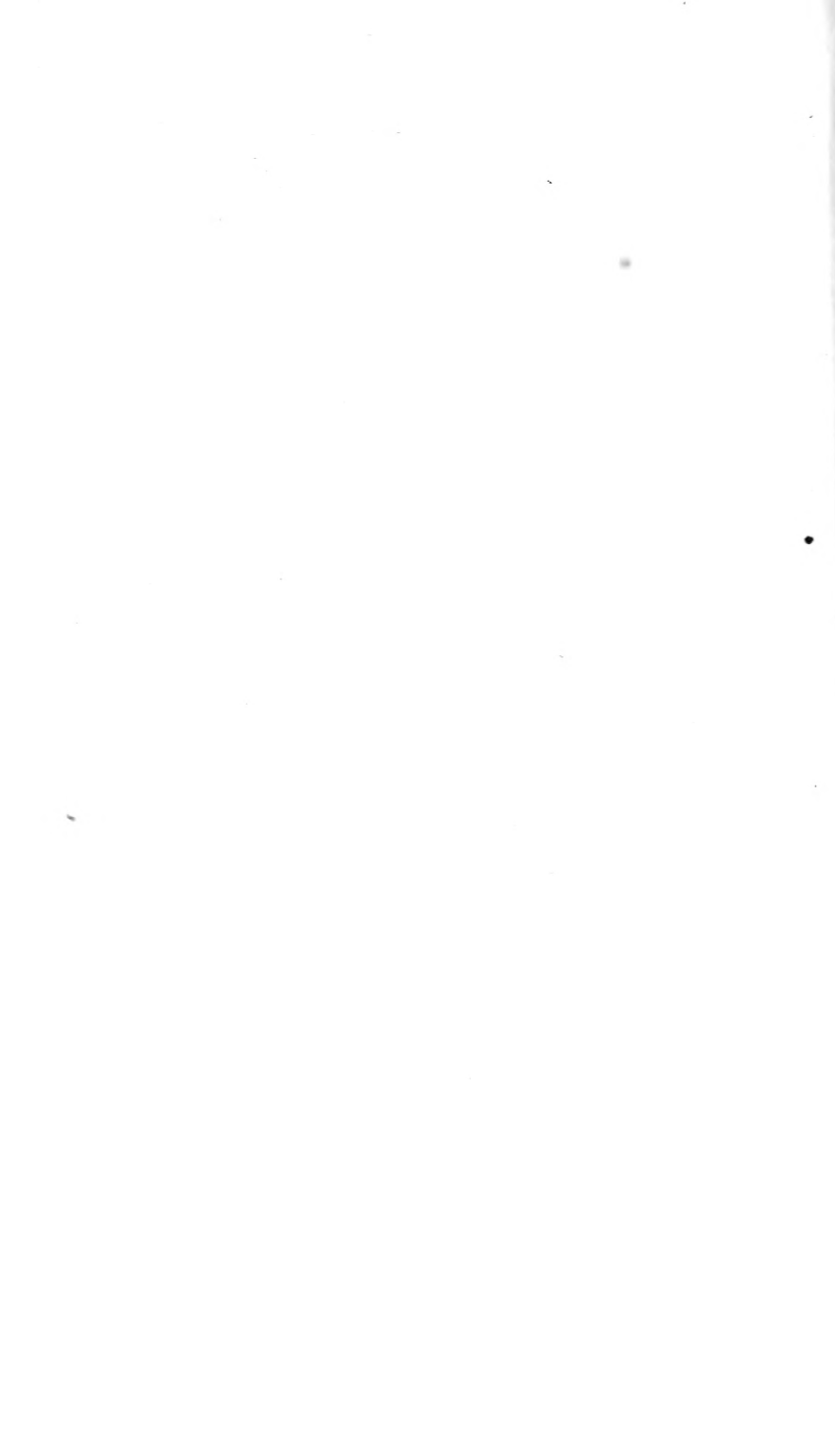
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FROM ITS FORMATION.

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- 1805. WILLIAM SAUNDERS, M.D.
- 1808. MATTHEW BAILLIE, M.D.
- 1810. SIR HENRY HALFORD, BART., M.D. G.C.H.
- 1813. SIR GILBERT BLANE, BART., M.D.
- 1815. HENRY CLINE.
- 1817. WILLIAM BABINGTON, M.D.
- 1819. SIR ASTLEY PASTON COOPER, BART., K.C.H. D.C.L.
- 1821. JOHN COOKE, M.D.
- 1823. JOHN ABERNETHY.
- 1825. GEORGE BIRKBECK, M.D.
- 1827. BENJAMIN TRAVERS.
- 1829. PETER MARK ROGET, M.D.
- 1831. WILLIAM LAWRENCE.
- 1833. JOHN ELLIOTSON, M.D.
- 1835. HENRY EARLE.
- 1837. RICHARD BRIGHT, M.D.
- 1839. SIR BENJAMIN COLLINS BRODIE, BART.
- 1841. ROBERT WILLIAMS, M.D.
- 1843. EDWARD STANLEY.
- 1845. WILLIAM FREDERICK CHAMBERS, M.D. K.C.H.
- 1847. JAMES MONCRIEFF ARNOTT.
- 1849. THOMAS ADDISON, M.D.
- 1851. JOSEPH HODGSON.

# FELLOWS

OF THE

## ROYAL MEDICAL AND CHIRURGICAL SOCIETY OF LONDON.

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### EXPLANATION OF THE ABBREVIATIONS.

P.—President.

V.P.—Vice-President.

T.—Treasurer.

S.—Secretary.

L.—Librarian.

C.—Member of Council.

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### AUGUST 1852.

Amongst the non-residents, those marked thus (\*) are entitled by composition to receive the Transactions.

#### *Elected*

- 1841 \*JAMES ABERCROMBIE, M.D., Cape of Good Hope.  
1846 \*JOHN ABERCROMBIE, M.D., Physician to the General Dispensary, Cheltenham ; Cheltenham.  
1851 \*HENRY WENTWORTH ACLAND, M.D., F.R.S., Physician to the Radcliffe Infirmary, Oxford.  
1847 ELIAS ACOSTA, Caraccas ; Venezuela.  
1842 WILLIAM ACTON, Queen Anne-street, Cavendish-square.  
1818 WALTER ADAM, M.D., Physician to the Royal Public Dispensary, Edinburgh.  
1851 JOHN ADAMS, Surgeon to the London Hospital ; St. Helen's Place, Bishopsgate-street.  
1852 WILLIAM ADAMS, 31, New Broad-street.  
1818 THOMAS ADDISON, M.D., Physician to, and Lecturer on Medicine at, Guy's Hospital ; New-street, Spring-gardens.  
C. 1826. V.P. 1837. P. 1849.  
1814 JOSEPH AGER, M.D., Great Portland-street, Portland-place.  
C. 1836.  
1837 \*RALPH FAWSETT AINSWORTH, M.D., Manchester.  
1819 GEORGE FREDERICK ALBERT.

*Elected*

- 1839 RUTHERFORD ALCOCK, K.C.T. K.T.S., China.
- 1826 JAMES ALDERSON, M.D. F.R.S., Physician to St. Mary's Hospital; Berkeley-square. S. 1829. C. 1848. T. 1849. V.P. 1852.
- 1843 CHARLES JAMES BERRIDGE ALDIS, M.D., Physician to the London and Surrey Dispensaries, and Lecturer on Medicine at the Hunterian School of Medicine; Chester-terrace, Chester-square.
- 1850 CHARLES REVANS ALEXANDER, Assistant-Surgeon to the Royal Infirmary for Diseases of the Eye; Cork-street, Bond-street.
- 1813 HENRY ALEXANDER, F.R.S., Surgeon-Oculist in Ordinary to the Queen, and Surgeon to the Royal Infirmary for Diseases of the Eye; Cork-street, Bond-street. C. 1840. V.P. 1850.
- 1836 HENRY ANCELL, Norfolk-crescent, Oxford-square. C. 1847.
- 1817 ALEXANDER ANDERSON.
- 1820 THOMAS ANDREWS, M.D., Norfolk, Virginia.
- 1813 WILLIAM ANKERS, Knutsford.
- 1819 PROFESSOR ANTONMARCHI, Florence.
- 1825 THOMAS GRAHAM ARNOLD, M.D., Stamford.
- 1819 JAMES MONCRIEFF ARNOTT, F.R.S., New Burlington-street. L. 1826. V.P. 1832. T. 1835. C. 1846. P. 1847.
- 1817 JOHN ASHBURNER, M.D., M.R.I.A., 40, York-place, Portman-square. C. 1821.
- 1851 THOMAS JOHN ASHTON, Surgeon to the Blenheim Dispensary; 31, Cavendish-square.
- 1811 JOHN AVERY, Surgeon to the Charing-cross Hospital; Queen-street, May-fair.
- 1825 BENJAMIN GUY BABINGTON, M.D. F.R.S., Physician to Guy's Hospital, and Physician to the Deaf and Dumb Institution; George-street, Hanover-square. C. 1829. V.P. 1845. T. 1848.
- 1816 CORNELIUS METCALFE STUART BABINGTON, M.D., Physician to Queen Charlotte's Lying-in Hospital; 29, Hertford-street, May-fair.
- 1820 \*JOHN H. BADLEY, Dudley.
- 1838 FRANCIS BADGLEY, M.D., Toronto, Upper Canada.

*Elected*

- 1840 WILLIAM BAINBRIDGE, Kingston, Surrey.
- 1836 ANDREW WOOD BAIRD, M.D., Ipswich.
- 1851 \*ALFRED BAKER, Surgeon to the General Hospital, Birmingham.
- 1839 THOMAS GRAHAM BALFOUR, M.D., Royal Military Asylum ; Chelsea. C. 1852.
- 1848 EDWARD BALLARD, M.D., Myddleton-square.
- 1849 THOMAS BALLARD, Southwick-place, Hyde-park.
- 1837 WILLIAM BALY, M.D. F.R.S., Physician to the Milbank Prison, and Lecturer on Forensic Medicine at St. Bartholomew's Hospital ; Queen Anne-street, Cavendish-square. C. 1845. L. 1847. S. 1848.
- 1847 ANDREW WHYTE BARCLAY, M.D., Physician to the Chelsea Dispensary ; Bruton-street, Berkeley-square.
- 1848 EDGAR BARKER, Edgeware-road, Hyde-park.
- 1833 THOMAS ALFRED BARKER, M.D., Physician to, and Lecturer on Medicine at, St. Thomas's Hospital ; Grosvenor-street, Grosvenor-square. C. 1844.
- 1843 THOMAS HERBERT BARKER, Priory-terrace, Bedford.
- 1847 GEORGE HILARO BARLOW, M.D., Physician to Guy's Hospital ; Union-street, Southwark.
- 1849 WILLIAM FREDERICK BARLOW, Resident Medical Officer, Westminster Hospital.
- 1840 BENJAMIN BARROW, Ryde, Isle of Wight.
- 1844 WILLIAM RICHARD BASHAM, M.D., *Secretary*, Physician to, and Lecturer on Materia Medica at, the Westminster Hospital ; Chester-street, Grosvenor-place.
- 1841 GEORGE BEAMAN, King-street, Covent-garden.
- 1836 WILLIAM BEAUMONT, Professor of Surgery in the University of King's College ; Toronto, Upper Canada.
- 1840 CHARLES BEEVOR, Surgeon to the St. Marylebone Dispensary ; Berners-street, Oxford-street.
- 1819 THOMAS BELL, F.R.S. L.S. and G.S., Professor of Zoology in King's College, London, and Lecturer on Diseases of the Teeth at Guy's Hospital ; New Broad-street, City. C. 1832.
- 1847 JAMES HENRY BENNET, M.D., Cambridge-square, Hyde-park.
- 1845 EDWIN UNWIN BERRY, James-street, Covent-garden.

*Elected*

- 1820 STEPHEN BERTIN, Paris.
- 1827 WILLIAM BIRCH, Barton, Lichfield.
- 1845 GOLDING BIRD, M.D. F.R.S., Assistant-Physician to, and Lecturer on Materia Medica at, Guy's Hospital; Russell-square.
- 1850 JAMES BIRD, M.D., Hyde-park-square, Hyde-park.
- 1849 EDMUND LLOYD BIRKETT, M.D., 4, Montague-street, Russell-square.
- 1851 GEORGE BIRKETT, M.D., 9, Duncan-terrace, Islington.
- 1851 JOHN BIRKETT, Assistant-Surgeon to, and Lecturer on Anatomy at, Guy's Hospital, 6, Wellington-street, Southwark.
- 1846 HUGH BIRT, Morro Velhio, Minas Geraes, Rio Janeiro, Brazil; Surgeon to the Morro Velhio Hospital.
- 1843 PATRICK BLACK, M.D., Assistant-Physician to St. Bartholomew's Hospital, and Warden to the Collegiate Establishment at St. Bartholomew's Hospital.
- 1844 THOMAS BLACKALL, M.D., Physician to the Seamen's Hospital Ship "Dreadnought;" Queen-street, May-fair.
- 1847 GEORGE C. BLACKMAN, M.D., New York, U.S.
- 1839 RICHARD BLAGDEN, Surgeon-Accoucheur, and Surgeon Extraordinary to the Queen; Surgeon in Ordinary to Her Royal Highness the Duchess of Kent; Albemarle-street, Piccadilly. C. 1847.
- 1814 THOMAS BLAIR, M.D., Physician to the Sussex County Hospital; Brighton, Sussex.
- 1840 PEYTON BLAKISTON, M.D. F.R.S., St. Leonard's-on-Sea.
- 1845 HENRY BLENKINSOP, Warwick.
- 1823 LOUIS HENRY BOJANUS, M.D., Wilna.
- 1816 HUGH BONE, M.D., Inspector-General of Hospitals; Edinburgh.
- 1810 JOHN KAYE BOOTH, M.D.
- 1816 PETER BOSSEY, Thomas-street, Woolwich.
- 1816 JOHN ASHTON BOSTOCK, 34, Clarges-street, Piccadilly.
- 1849 EDWARD BARONS BOWMAN, M.D., Oxford-terrace, Middleton road, Dalston.
- 1811 WILLIAM BOWMAN, F.R.S., Professor of Physiology and General Anatomy at King's College, London; Assistant-

*Elected*

- Surgeon to King's College Hospital, and to the Royal Ophthalmic Hospital, Moorfields; Clifford-street, Bond-street.
- 1814 RICHARD BRIGHT, M.D. F.R.S., Physician Extraordinary to the Queen, and Consulting Physician to Guy's Hospital; Savile-row, Regent-street. C. 1821. V.P. 1827. P. 1837.
- 1851 BERNARD EDWARD BRODHURST, Assistant-Surgeon to the Royal Orthopædic Hospital, Brook-street, Grosvenor-square.
- 1813 SIR BENJAMIN COLLINS BRODIE, BART., D.C.L. F.R.S., Serjeant-Surgeon to the Queen, Surgeon in Ordinary to His Royal Highness Prince Albert, Foreign Correspondent of the Institute of France, and Foreign Associate of the Royal Academy of Medicine of Paris; Savile-row, Regent-Street. C. 1814. V.P. 1816. P. 1839.
- 1844 CHARLES BROOKE, B.A. (Cantab.) F.R.S., Keppel-street, Russell-square.
- 1848 WILLIAM PHILPOT BROOKES, M.D., Surgeon to the Cheltenham General Hospital and Dispensary, and Visiting Medical Officer to the Cheltenham District of Lunatic Asylums; Albion House, Cheltenham.
- 1842 CHARLES BLAKELY BROWN, M.B., Physician to Queen Charlotte's Lying-in Hospital, and St. George's and St. James's Dispensary; Hill-street, Berkeley-square.
- 1847 GEORGE BROWN, Grenadier Guards' Hospital, Rochester-row, Westminster.
- 1847 \*ROBERT BROWN, Winckley-square, Preston, Lancashire.
- 1851 ALEXANDER BROWNE, M.D., Army and Navy Club, St. James's-square.
- 1818 \*SAMUEL BARWICK BRUCE, Surgeon to the Forces; Ripon.
- 1827 M. PIERRE BRULATOUR, Surgeon to the Hospital; Bordeaux.
- 1823 B. BARTLET BUCHANAN, M.D.
- 1843 JOHN CHARLES BUCKNILL, M.B., Axminster, Devonshire.
- 1839 GEORGE BUDD, M.D. F.R.S., Fellow of Caius College, Cambridge; Professor of Medicine in King's College, London; Physician to King's College Hospital; Dover-street, Piccadilly. C. 1846.

*Elected*

- 1839 THOMAS HENRY BURGESS, M.D., Half-moon-street, Piccadilly.
- 1833 GEORGE BURROWS, M.D. F.R.S., Physician to, and Lecturer on Medicine at, St. Bartholomew's Hospital; Cavendish square. C. 1839. T. 1845. V.P. 1849.
- 1820 SAMUEL BURROWS.
- 1837 GEORGE BUSK, F.R.S., Surgeon to the Seamen's Hospital-ship "Dreadnought;" Croom's-hill, Greenwich. C. 1847.
- 1850 JOHN STEVENSON BUSHNAN, M.D., Nottingham-place, New-road.
- 1818 JOHN BUTTER, M.D. F.R.S. F.L.S., Physician to the Plymouth Eye Infirmary; Plymouth.
- 1851 \*WILLIAM CADGE, All Saints, Norwich.
- 1851 THOMAS CALLAWAY, Demonstrator of Anatomy at Guy's Hospital; Wellington-street, Southwark.
- 1852 \*GEORGE CANNEY, Bishop's Auckland, Durham.
- 1842 HENRY CANTIS, Maddox-street, Hanover-square.
- 1847 JOHN BURFORD CARLILL, M.D., Berners-street, Oxford-street.
- 1839 SIR ROBERT CARSWELL, M.D., Physician to his Majesty the King of the Belgians; Brussels.
- 1825 HARRY CARTER, M.D., Physician to the Kent and Canterbury Hospital; Canterbury.
- 1818 \*RICHARD CARTWRIGHT.
- 1820 SAMUEL CARTWRIGHT, F.R.S., Savile-row, Regent-street, and Nizell's House, near Tonbridge.
- 1845 SAMUEL CARTWRIGHT, Jun., Savile-row, Regent-street.
- 1839 WILLIAM CATHROW, Weymouth-street, Portland-place.
- 1845 WILLIAM OLIVER CHALK, Nottingham-terrace, New-road.
- 1818 RICHARD CHAMBERLAINE, Kingston, Jamaica.
- 1844 THOMAS KING CHAMBERS, M.D., Physician to St. Mary's Hospital; Hill-street, Berkeley-square.
- 1816 \*WILLIAM FREDERICK CHAMBERS, M.D. K.C.H. F.R.S., Physician to the Queen; Hardle House, near Lymington, Hants. C. 1818. V.P. 1821. P. 1845.
- 1849 FREDERICK CHAPMAN, Richmond-green, Richmond, Surrey.
- 1837 HENRY THOMAS CHAPMAN, Lower Seymour-street, Portman-square.

*Elected*

- 1838 GEORGE CHAPLIN CHILD, M.D., Consulting Physician to the Westminster General Dispensary; Queen Anne-street, Cavendish-square.
- 1852 GEORGE BORLASE CHILD, Finsbury-place South, Finsbury square.
- 1849 WILLIAM FRANCIS CHORLEY, M.D., Physician to the St. Marylebone Dispensary; 3, South Molton-street, Oxford-street.
- 1842 WILLIAM DINGLE CHOWNE, M.D., Physician to the Charing-cross Hospital; Connaught-place West, Hyde-park.
- 1847 BENJAMIN CLARK, Brook-street, Grosvenor-square.
- 1839 FREDERICK LE GROS CLARK, Assistant-Surgeon to, and Lecturer on Descriptive and Surgical Anatomy at, St. Thomas's Hospital; Consulting Surgeon to the Western General Dispensary; Spring-gardens. S. 1847.
- 1827 SIR JAMES CLARK, Bart., M.D. F.R.S., Physician to the Queen, Physician in Ordinary to his Royal Highness Prince Albert, and Consulting Physician to his Majesty the King of the Belgians; Brook-street, Grosvenor-square. C. 1830. V.P. 1832.
- 1845 JOHN CLARK, M.D., Staff Surgeon, 2d class; West Indies.
- 1848 JOHN CLARKE, M.D., Physician to the British Lying-in Hospital; Clifford-street, Bond-street.
- 1850 JOSIAH CLARKSON, Birmingham.
- 1835 JAMES CLAYTON, Percy-street, Bedford-square. C. 1850.
- 1842 OSCAR MOORE PASSEY CLAYTON, Percy-street, Bedford-square.
- 1851 EDWARD COCK, Surgeon to Guy's Hospital; St. Thomas's-street, Southwark.
- 1850 DANIEL WHITAKER COHEN, M.D., Assistant-Physician to St. Thomas's Hospital; Cleveland-row, St. James's.
- 1835 \*WILLIAM COLBORNE, Chippenham, Wiltshire.
- 1818 ROBERT COLE, F.L.S., Holybourne, Hampshire.
- 1828 JOHN CONOLLY, M.D. D.C.L., Hanwell, Middlesex.
- 1840 \*WILLIAM ROBERT COOKE, Burford, Oxfordshire.
- 1820 BENJAMIN COOPER, Stamford.
- 1840 BRANSBY BLAKE COOPER, F.R.S., Surgeon to, and Lecturer on Surgery at, Guy's Hospital; New-street, Spring-gardens. C. 1830. V.P. 1842.

*Elected*

- 1819 GEORGE COOPER, Brentford, Middlesex.
- 1841 GEORGE LEWIS COOPER, Surgeon to the Bloomsbury Dispensary; Woburn-place, Russell-square.
- 1843 WILLIAM WHITE COOPER, Senior Surgeon to the North London Eye Infirmary, to the Honorable Artillery Company, and Ophthalmic Surgeon to St. Mary's Hospital; Berkeley-square.
- 1841 HOLMES COOTE, Demonstrator of Anatomy at St. Bartholomew's Hospital; Queen-square, Bloomsbury.
- 1835 GEORGE FORD COPLAND, Cheltenham.
- 1822 JAMES COPLAND, M.D. F.R.S., Consulting Physician to Queen Charlotte's Lying-in Hospital; Old Burlington-street. C. 1830. V.P. 1838.
- 1847 JOHN ROSE CORMACK, M.D., Putney, Surrey.
- 1839 \*CHARLES CESAR CORSELLIS, M.D., Resident Physician to the Lunatic Asylum, Wakefield, Yorkshire.
- 1847 RICHARD PAYNE COTTON, M.D., Assistant-Physician to the Hospital for Consumption and Diseases of the Chest; 46, Clarges-street, Piccadilly.
- 1828 WILLIAM COULSON, *Vice-President*, Surgeon to the Magdalen Hospital, Consulting Surgeon to the City Lying-in Hospital, and Senior-Surgeon to St. Mary's Hospital; Frederick's-place, Old Jewry. C. 1831. L. 1832.
- 1817 \*SIR PHILIP CRAMPTON, Bart., F.R.S., Surgeon-General to the Forces in Ireland, Dublin.
- 1841 MERVYN ARCHDALL NOTT CRAWFORD, M.D., Physician to, and Lecturer on Medicine at, the Middlesex Hospital; Upper Berkeley-street, Portman-square.
- 1822 SIR ALEXANDER CRICHTON, M.D. F.R.S. and F.L.S., Physician in Ordinary to their Imperial Majesties the Emperor and Dowager Empress of all the Russias; the Grove, Sevenoaks, Kent. C. 1823.
- 1847 GEORGE CRITCHETT, Assistant-Surgeon to the London Hospital, and the Royal London Ophthalmic Hospital; Finsbury-square.
- 1837 JOHN FARRAR CROOKES, Russell-square.
- 1849 \*WILLIAM EDWARD CROWFOOT, Beccles, Suffolk.
- 1851 JAMES CAMERON CUMMING, M.D., 1, Cadogan-place, Sloane-street.

*Elected*

- 1818 WILLIAM CUMING, M.D., Professor of Botany at the Glasgow Institution, and Surgeon to the Royal Infirmary at Glasgow.
- 1846 HENRY CURLING, Ramsgate, Kent.
- 1837 THOMAS BLIZARD CURLING, F.R.S., Surgeon to, and Lecturer on Surgery at, the London Hospital; New Broad-street, City. S. 1845. C. 1850.
- 1847 JOHN EDMUND CURREY, M.D., Lismore, Ireland.
- 1836 GEORGE CURSHAM, M.D., Physician to the Hospital for Consumption and Diseases of the Chest, and to the Female Orphan Asylum; Savile-row, Regent-street. S. 1842. C. 1850.
- 1822 CHRISTOPHER JOHN CUSACK, Chateau d'Eu, France.
- 1852 THOMAS CUTLER, M.D., Physician to the Spa General Dispensary; Spa, Belgium.
- 1828 ADOLPHE DALMAS, M.D., Paris.
- 1851 NATHANIEL JOHN DAMPIER, Woburn-place, Russell-square.
- 1836 \*JAMES STOCK DANIEL, Ramsgate.
- 1850 JOHN BAMPFYLDE DANIELL, M.D., Physician to the Royal Pimlico Dispensary; Grosvenor-street, Grosvenor-square.
- 1820 GEORGE DARLING, M.D., Russell-square. C. 1841.
- 1818 \*SIR FRANCIS SACHEVEREL DARWIN, Knt., M.D., Breadsall Priory, near Derby.
- 1848 HENRY DAUBENY, 34, Dorset-place, Dorset-square.
- 1846 FREDERICK DAVIES, Surgeon to the Northern Dispensary; Upper Gower-street, Bedford-square.
- 1818 \*HENRY DAVIES, M.D., 6, Duchess-street, Portland-place. C. 1827. V.P. 1848.
- 1847 JOHN DAVIES, M.D., Physician to the Hertford Infirmary, and Visiting Physician to the County Gaol and Lunatic Asylum, Hertford.
- 1852 WILLIAM DAVIES, M.D., Senior Physician to the United Hospital, Bath; Gay-street, Bath.
- 1852 JOHN HALL DAVIS, M.D., Russell-place, Fitzroy-square.
- 1820 THOMAS DAVIS, Spring-gardens. C. 1843.
- 1818 JAMES DAWSON, Liverpool.
- 1847 GEORGE EDWARD DAY, M.D. F.R.S., Chandos Professor of Medicine, St. Andrew's.

*Elected*

- 1841 CAMPBELL DE MORGAN, *Secretary*, Surgeon to, and Lecturer on Physiology at, the Middlesex Hospital; Upper Seymour-street, Portman-square.
- 1846 \*SAMUEL BEST DENTON, Ivy-lodge, Hornsea, East Riding, Yorkshire.
- 1844 ROBERT DICKSON, M.D., Hertford-street, May-fair.
- 1839 JAMES DIXON, *Librarian*, Assistant-Surgeon to St. Thomas's Hospital, and Surgeon to the Royal London Ophthalmic Hospital; Green-street, Park-lane.
- 1845 JOHN DODD, Bryanston-street, Portman-square.
- 1846 JOHN DRUMMOND, Deputy Inspector of Fleets and Hospitals; Royal Naval Hospital, Chatham.
- 1843 THOMAS JONES DRURY, M.D., Physician to the Salop Infirmary; Shrewsbury.
- 1845 GEORGE DUFF, M.D, 53, Upper Seymour-street, Portman-square.
- 1845 EDWARD WILLSON DUFFIN, Langham-place, Portland-place.
- 1833 ROBERT DUNN, Norfolk-street, Strand. C. 1845.
- 1843 CHRISTOPHER MERCER DURRANT, M.D., Physician to the East Suffolk and Ipswich Hospital; Ipswich, Suffolk.
- 1839 HENRY SUMNER DYER, M.D., Bryanston-square.
- 1836 JAMES WILLIAM EARLE, Norwich.
- 1824 GEORGE EDWARDS.
- 1823 CHARLES CHANDLER EGERTON, Kendall-lodge, Epping.
- 1848 GEORGE VINER ELLIS, Professor of Anatomy in University College, London; Albert-street, Regent's-park.
- 1835 WILLIAM ENGLAND, M.D., Wisbeach, Cambridgeshire.
- 1842 JOHN ERIC ERICHSEN, Professor of Surgery in University College, London, and Surgeon to University College Hospital; Welbeck-street, Cavendish-square.
- 1815 GRIFFITH FRANCIS DORSETT EVANS, M.D., High-street, Bedford. C. 1838.
- 1836 GEORGE FABIAN EVANS, M.D., Physician to the General Hospital, Birmingham.
- 1845 WILLIAM JULIAN EVANS, M.D.
- 1841 SIR JAMES EYRE, M.D., Consulting Physician to St. George's and St. James's Dispensary; Brook-street, Grosvenor-square. C. 1851.

*Elected*

- 1844 ARTHUR FARRE, M.D. F.R.S., Professor of Midwifery in King's College, London; Hertford-street, May-fair.
- 1831 ROBERT FERGUSON, M.D., Physician-Accoucheur to the Queen, Physician to the Westminster Lying-in Hospital; Park-street, Grosvenor-square. C. 1839. V.P. 1847.
- 1841 WILLIAM FERGUSSON, F.R.S., Professor of Surgery in King's College, London; Surgeon to King's College Hospital, and to H.R.H., Prince Albert; George-street, Hanover-square. C. 1849.
- 1850 \*FREDERICK FIELD, Birmingham.
- 1849 GEORGE TUPMAN FINCHAM, M.D., Physician to the Western Dispensary; Chapel-street, Grosvenor-place.
- 1836 JOHN WILLIAM FISHER, Surgeon-in-Chief to the Metropolitan Police Force; Grosvenor-gate. C. 1843.
- 1838 GEORGE LIONEL FITZMAURICE, Gloucester-place, Portman-square.
- 1842 THOMAS BELL ELCOCK FLETCHER, M.D., Physician to the General Hospital, Birmingham.
- 1841 JOHN FORBES, M.D. F.R.S. D.C.L., Physician to her Majesty's Household; Old Burlington-street. C. 1852.
- 1848 JOHN GREGORY FORBES, Surgeon to the Western General Dispensary; Devonport-street, Hyde-park.
- 1852 JOHN COOPER FORSTER, 11, Wellington-st., London-bridge.
- 1817 \*ROBERT THOMAS FORSTER, Southwell, Notts.
- 1820 THOMAS FORSTER, M.D., Hartfield-lodge, East Grinstead.
- 1846 ALGERNON FRAMPTON, M.D., Physician to the London Hospital; New Broad-street, City.
- 1816 JOHN W. FRANCIS, M.D., Professor of Materia Medica in the University of New York, U.S.
- 1841 JOHN CHRISTOPHER AUGUST. FRANZ, M.D., Royal German Spa, Brighton.
- 1843 PATRICK FRASER, M.D., Assistant-Physician to the London Hospital; Guilford-street, Russell-square.
- 1836 JOHN GEORGE FRENCH, Surgeon to St. James's Infirmary; Great Marlborough-street, Regent-street. C. 1852.
- 1849 ROBERT TEMPLE FRERE, M.D., Physician-Accoucheur to, and Lecturer on Midwifery at, the Middlesex Hospital; Queen-street, May-fair.

*Elected*

- 1846 HENRY WILLIAM FULLER, M.D., Assistant-Physician to, and Lecturer on Medical Jurisprudence at, St. George's Hospital; Manchester-square.
- 1815 \*GEORGE FREDERICK FURNIVAL, Egham, Surrey.
- 1851 GEORGE GASKOIN, Cambridge-terrace, Hyde-park.
- 1819 JOHN SAMUEL GASKOIN, Clarges-street, Piccadilly. C. 1836.
- 1819 HENRY GAULTER.
- 1848 JOHN GAY, Surgeon to the Royal Free Hospital; Finsbury-place, Finsbury-square.
- 1821 \*RICHARD FRANCIS GEORGE, Surgeon to the Bath Hospital.
- 1812 GEORGE GOLDIE, M.D., York.
- 1851 STEPHEN JENNINGS GOODFELLOW, M.D., Physician to the Royal General Dispensary, and Lecturer on Forensic Medicine at the Middlesex Hospital; Russell-square.
- 1818 JAMES ALEXANDER GORDON, M.D. F.R.S., Burford-lodge, Box-hill. C. 1828. V.P. 1829.
- 1851 PETER YEAMES GOWLLAND, Finsbury-square.
- 1844 JOHN GRANTHAM, Crayford, Kent.
- 1850 HENRY GRAY, F.R.S., Wilton-street, Grosvenor-place.
- 1846 GEORGE THOMPSON GREAM, M.D., 2, Upper Brook-street, Grosvenor-square.
- 1816 JOSEPH HENRY GREEN, F.R.S., Surgeon to, and Lecturer on Surgery at, St. Thomas's Hospital; Hadley, Middlesex. C. 1820. V.P. 1830.
- 1811 GEORGE GREGORY, M.D., Physician to the Smallpox Hospital; Camden-square, Camden New-town. S. 1825. C. 1849.
- 1843 ROBERT GREENHALGH, Surgeon-Accoucheur to the Royal General Dispensary, St. Pancras; 11, Upper Woburn-place, Russell-square.
- 1814 JOHN GROVE, M.D., Salisbury.
- 1852 JOHN GROVE, Wandsworth, Surrey.
- 1849 WILLIAM WITHEY GULL, M.D., Assistant-Physician to Guy's Hospital; Finsbury-square.
- 1837 JAMES MANBY GULLY, M.D., Holyrood-House, Great Malvern.
- 1819 SIR JOHN GUNNING, Knight, C.B., Inspector of Hospitals; Paris.

*Elected*

- 1842 CHARLES WILLIAM GARDINER GUTHRIE, Assistant-Surgeon to the Westminster Hospital, and to the Westminster Ophthalmic Hospital, 4, Berkeley-street, Piccadilly.
- 1849 HAMMETT HAILEY, Newport Pagnell, Bucks.
- 1852 ROBERT JAMES HALE, M.D., 21, Finchley-road, St. John's-Wood.
- 1842 \*GEORGE HALL, M.D.
- 1845 JOHN HALL, M.D., Deputy Inspector-General of Hospitals; Cape of Good Hope.
- 1848 ALEXANDER HALLEY, M.D., Queen Anne-street, Cavendish-square.
- 1819 THOMAS HAMMERTON, Piccadilly. C. 1829.
- 1838 HENRY HANCOCK, Surgeon to the Charing-cross Hospital; Harley-street, Cavendish-square. C. 1851.
- 1849 \*RICHARD JAMES HANSARD, Broad-street, Oxford.
- 1848 \*GEORGE HARCOURT, M.D., Chertsey, Surrey.
- 1836 JOHN FOSSE HARDING, Mylne-street, Myddleton-square.
- 1843 THOMAS SUNDERLAND HARRISON, M.D. F.L.S., Garston-lodge, Somersetshire.
- 1846 JOHN HARRISON, the Court-yard, Albany.
- 1841 WILLIAM HARVEY, Surgeon to the Royal Dispensary for Diseases of the Ear, and to the Freemasons' Female Charity; Soho-square.
- 1828 CÆSAR HENRY HAWKINS, President of the Royal College of Surgeons of England, Surgeon to St. George's Hospital; Grosvenor-street, Grosvenor-square. C. 1830. V.P. 1838. T. 1841.
- 1838 CHARLES HAWKINS, Savile-row, Regent-street. C. 1846. S. 1850.
- 1848 THOMAS HAWKSLEY, M.D., George-street, Hanover-square.
- 1820 THOMAS EMERSON HEADLAM, M.D., Newcastle-upon-Tyne.
- 1848 JAMES NEWTON HEALE, M.D., Physician to the Royal Free Hospital; Westbourne-crescent, Hyde-park.
- 1850 GEORGE HEATON, M.D., Boston, U.S.
- 1829 THOMAS HEBERDEN, M.D., Park-street, Grosvenor-square.
- 1844 JOHN HENNEN, M.D., Physician to the Western General Dispensary; Upper Southwick-street, Hyde-park. L. 1848.

*Elected*

- 1848 MITCHELL HENRY, Assistant-Surgeon to the Middlesex Hospital; Harley-street, Cavendish-square.
- 1849 AMOS HENRIQUES, Upper Berkeley-street, Portman-square.
- 1821 VINCENT HERBERSKI, M.D., Professor of Medicine in the University of Wilna.
- 1843 PRESCOTT GARDNER HEWETT, Assistant-Surgeon to the St. George's Hospital, Lecturer on Anatomy at St. George's Hospital Medical School; Hertford-street, May-fair.
- 1841 \*NATHANIEL HIGHMORE, Consulting-Surgeon to the Weymouth and Dorsetshire Eye Infirmary; Sherborne, Dorsetshire.
- 1814 \*WILLIAM HILL, Wooton-under-Edge, Gloucestershire.
- 1842 WILLIAM AUGUSTUS HILLMAN, Lecturer on Anatomy and Physiology at the Westminster Hospital, Surgeon to the Farringdon General Dispensary; Argyll-street, Regent-street.
- 1841 JOHN HILTON, F.R.S., Surgeon to, and Lecturer on Anatomy at, Guy's Hospital; New Broad-street, City. C. 1851.
- 1848 MARTIN THOMAS HISCOX, M.D., Bath, Somersetshire.
- 1840 THOMAS HODGKIN, M.D., Bedford-square. C. 1842.
- 1813 JOSEPH HODGSON, F.R.S., *President*; Westbourne-terrace, Hyde-park. C. 1817.
- 1835 THOMAS HENRY HOLBERTON, Hampton, Middlesex.
- 1843 LUTHER HOLDEN, Ely-place, Holborn.
- 1814 HENRY HOLLAND, M.D. F.R.S., Physician Extraordinary to the Queen, and Physician in Ordinary to H.R.H. Prince Albert; Brook-street, Grosvenor-square. C. 1817. V.P. 1826.
- 1846 BARNARD WIGHT HOLT, Surgeon to the Westminster Hospital; Parliament-street, Westminster.
- 1846 CARSTEN H. HOLTHOUSE, Surgeon to the Public Dispensary, Lincoln's Inn; Lecturer on Anatomy and Physiology; Serle-street, Lincoln's-inn-fields.
- 1819 \*JOHN HOWELL, M.D. F.R.S. E.; Clifton, Gloucestershire.
- 1828 \*EDWARD HOWELL, M.D., Swansea, Glamorganshire.
- 1844 EDWIN HUMBY, Windsor-terrace, Maida-hill.
- 1822 ROBERT HUME, M.D. C.B., Inspector of Hospitals; Commissioner in Lunacy; Curzon-street, May-fair. V.P. 1836.

*Elected*

- 1840 HENRY HUNT, M.D., Brook-street, Hanover-square.
- 1842 CHRISTOPHER THOMAS AGRIPPA HUNTER, Downham, Norfolk.
- 1849 EDWARD LAW HUSSEY, Surgeon to the Radcliffe Infirmary, Oxford.
- 1820 WILLIAM HUTCHINSON, M.D.
- 1840 CHARLES HUTTON, M.D., Physician to the Royal Infirmary for Children; Assistant-Physician to the General Lying-in Hospital; Lowndes-street, Belgrave-square.
- 1848 GEORGE COCKBURN HYDE, 5, Halkin-street, Belgrave-sq.
- 1838 WILLIAM IFIL, M.D.
- 1847 WILLIAM EDMUND IMAGE, Surgeon to the Suffolk General Hospital; Bury St. Edmund's, Suffolk.
- 1826 WILLIAM INGRAM, Midhurst, Sussex.
- 1839 ALEXANDER RUSSELL JACKSON, M.D., Warley Barracks, Essex.
- 1845 \*HENRY JACKSON, Surgeon to the Sheffield General Infirmary; St. James's Row, Sheffield.
- 1841 PAUL JACKSON, Thayer-street, Manchester-square.
- 1847 THOMAS REYNOLDS JACKSON, Charles-street, St. James's.
- 1841 MAXIMILIAN MORITZ JACBOVICZ, M.D., Pesth.
- 1825 JOHN B. JAMES, M.D.
- 1847 \*WILLIAM WITHALL JAMES, Exeter, Devonshire.
- 1844 SAMUEL JOHN JEAFFRESON, M.D., Leamington, Warwickshire.
- 1839 JULIUS JEFFREYS, F.R.S., Bath, Somersetshire.
- 1840 \*GEORGE SAMUEL JENKS, M.D., Brighton.
- 1851 WILLIAM JENNER, M.D., Professor of Pathological Anatomy in University College, and Assistant-Physician to University College Hospital, Albany-street, Regent's-park.
- 1848 ATHOL ARCHIBALD WOOD JOHNSON, Lecturer on Physiology at St. George's Hospital Medical School; and Surgeon to St. George's and St. James's Dispensary; Half Moon-street, Piccadilly.
- 1851 EDMUND CHARLES JOHNSON, M.D., Savile-row; and Arlington-street, Piccadilly.
- 1821 SIR EDWARD JOHNSON, M.D., Weymouth, Dorsetshire.

*Elected*

- 1847 GEORGE JOHNSON, M.D., Assistant-Physician to King's College Hospital; Woburn-square.
- 1837 HENRY CHARLES JOHNSON, Assistant-Surgeon to, and Lecturer on Medical Jurisprudence at, St. George's Hospital; Savile-row, Regent-street. C. 1850.
- 1844 JOHN JOHNSON, Old Burlington-street.
- 1844 HENRY BENICE JONES, M.D. F.R.S., Physician to St. George's Hospital; Grosvenor-street, Grosvenor-square.
- 1835 HENRY DERVICHE JONES, Soho-square.
- 1837 THOMAS WILLIAM JONES, M.D., Physician to the City Dispensary; Finsbury-pavement, Finsbury-square.
- 1829 \*GEORGE CHARLES JULIUS, Richmond, Surrey.
- 1816 \*GEORGE HERMANN KAUFFMANN, M.D., Hanover.
- 1815 ROBERT KEATE, Serjeant-Surgeon to the Queen, Surgeon to H.R.H. the Duchess of Gloucester, and to St. George's Hospital; Hertford-street, May-fair. C. 1818. V.P. 1826.
- 1848 \*DANIEL BURTON KENDELL, M.D., St. John's, Wakefield, Yorkshire.
- 1847 ALFRED KEYSER, Norfolk-crescent, Oxford-square.
- 1839 \*DAVID KING, M.D., Eltham, Kent.
- 1851 JOHN ABERNETHY KINGDON, New Bank-buildings, City.
- 1836 PETER NUGENT KINGSTON, M.D., Physician to the Westminster Hospital; 8, Kensington-gate, Hyde-park. C. 1846.
- 1840 SAMUEL ARMSTRONG LANE, Lecturer on Anatomy; Surgeon to the Lock Hospital, and to St. Mary's Hospital; Grosvenor-place, Hyde-park. C. 1849.
- 1841 \*CHARLES LASHMAR, M.D., Croydon, Surrey.
- 1816 G. E. LAWRENCE.
- 1809 WILLIAM LAWRENCE, F.R.S., Surgeon Extraordinary to the Queen; Surgeon to St. Bartholomew's Hospital, and to Bridewell and Bethlem Hospitals; Lecturer on Surgery at St. Bartholomew's Hospital; Whitehall-place, Whitehall. S. 1813. V.P. 1818. C. 1820. T. 1821. P. 1831.
- 1810 THOMAS LAYCOCK, M.D., York.
- 1843 \*JESSE LEACH, Heywood, near Bury, Lancashire.

*Elected*

- 1823 JOHN G. Leath, M.D.
- 1822 JOHN JOSEPH LEDSAM, M.D.
- 1822 ROBERT LEE, M.D. F.R.S., Physician to the British Lying-in Hospital; Physician-Accoucheur to the St. Mary-lebone Infirmary; and Lecturer on Midwifery at St. George's Hospital; Savile-row, Regent-street. C. 1829. S. 1830. V.P. 1835.
- 1823 HENRY LEE, M.D., Keppel-street, Russell-square. C. 1837. S. 1839.
- 1843 HENRY LEE, Assistant-Surgeon to King's College Hospital, and Surgeon to the Lock Hospital; Dover-street, Piccadilly.
- 1851 GEORGE MACARTNEY LEESE, Gloucester-place, Portman-square.
- 1836 FREDERICK LEIGHTON, M.D., Franckfort-on-the-Maine.
- 1847 JOHN CHARLES WEAVER LEVER, M.D., Physician-Accoucheur to Guy's Hospital; Wellington-street, Southwark.
- 1847 SIR JOHN LIDDELL, M.D. F.R.S. C.B., Inspector of Hospitals; Royal Hospital, Greenwich.
- 1806 JOHN LIND, M.D.
- 1845 WILLIAM JOHN LITTLE, M.D., Physician to, and Lecturer on Medicine at, the London Hospital; Finsbury-square.
- 1819 ROBERT LLOYD, M.D.
- 1824 EUSEBIUS ARTHUR LLOYD, Surgeon to St. Bartholomew's and Christ's Hospitals; Bedford-row. S. 1827. V.P. 1838. C. 1843.
- 1820 J. G. LOCHER, M.C.D., Town Physician of Zurich.
- 1844 EDWARD FRANCIS LONSDALE, Surgeon to the Royal Orthopædic Hospital; Montague-street, Russell-square.
- 1824 CHARLES LOCOCK, M.D., First Physician-Accoucheur to the Queen, and Consulting Physician to the General Lying-in Hospital; Hertford-street, May-fair. C. 1826. V.P. 1841.
- 1852 CHARLES LODGE, M.D., Rye-lane, Peckham, Surrey.
- 1846 HENRY THOMAS LOMAX, Stafford.
- 1836 JOSEPH S. LÖWENFELD, M.D., Berbice.

*Elected*

- 1815 \*PETER LUARD, M.D.
- 1852 JAMES LUKE, Senior-Surgeon to the London Hospital; Vice-President of the Royal College of Surgeons of England; Broad-street Buildings.
- 1847 HENRY JOHN M'DOUGALL.
- 1846 WILLIAM M'EWEN, M.D., Surgeon to the Cheshire County Gaol, and House-Surgeon to the Chester General Infirmary; Newgate-street, Chester.
- 1814 SIR JAMES MACGRIGOR, Bart., M.D. K.C.B. K.T.S. LL.D. F.R.S. L. and E., Director-General of the Medical Department of the Army; Harley-street, Cavendish-square. C. 1820. V.P. 1815.
- 1823 GEORGE MACILWAIN, Consulting Surgeon to the Finsbury Dispensary; the Court-Yard, Albany. C. 1829. V.P. 1848.
- 1839 WILLIAM MACINTYRE, M.D., Harley-street, Cavendish-square. C. 1850.
- 1848 FREDERICK WILLIAM MACKENZIE, M.D., Chester-place, Hyde-park-square.
- 1818 WILLIAM MACKENZIE, Surgeon to the Eye Infirmary, Glasgow.
- 1822 RICHARD MACKINTOSH, M.D.
- 1844 DANIEL MACLACHLAN, M.D., Physician to the Royal Hospital, Chelsea, and Deputy Inspector-General of Hospitals; Royal Hospital, Chelsea.
- 1851 SAMUEL MACLEAN, Brook-street, Grosvenor-square.
- 1849 DUNCAN MACLACHLAN MACLURE, Harley-street, Cavendish-square.
- 1842 JOHN MACNAUGHT, M.D., Bedford-street, Liverpool.
- 1835 DANIEL CHAMBERS MACREIGHT, M.D., St. Hillier's, Jersey.
- 1837 ANDREW MELVILLE M'WHINNIE, Lecturer on Comparative Anatomy at St. Bartholomew's Hospital; Assistant-Surgeon to the London Hospital for Diseases of the Skin; Bridge-street, Blackfriars. C. 1851.
- 1818 WILLIAM ORLANDO MARKHAM, M.D., Assistant-Physician to St. Mary's Hospital; Clarges-street, Piccadilly.

*Elected*

- 1824 SIR HENRY MARSH, Bart., M.D., Dublin.
- 1838 THOMAS PARR MARSH, M.D., Physician to the Salop Infirmary, Shrewsbury.
- 1851 JOHN MARSHALL, Assistant-Surgeon to University College Hospital, 10, George-street, Hanover-square.
- 1841 JAMES RANALD MARTIN, F.R.S., Lower Grosvenor-street, Grosvenor-square.
- 1819 \*JOHN MASFEN, Surgeon to the County General Infirmary, and Fever Hospital, Stafford.
- 1849 GEORGE BELLASIS MASFEN, Stafford.
- 1818 J. P. MAUNOIR, Professor of Surgery at Geneva.
- 1837 THOMAS MAYO, M.D. F.R.S., *Vice-President*, Physician to the St. Marylebone Infirmary; Wimpole-street, Cavendish-square. S. 1841. C. 1847.
- 1839 RICHARD HENRY MEADE, Bradford, Yorkshire.
- 1819 \*THOMAS MEDHURST, Hurstbourne Tarrant, Hampshire.
- 1837 SAMUEL WILLIAM JOHN MERRIMAN, M.D., Physician to the Royal Infirmary for Children; Consulting Physician to the Westminster General Dispensary; and Assistant-Physician to the West London Lying-in Institution; Brook-street, Grosvenor-square. C. 1851.
- 1852 JAMES MERRYWEATHER, 57, Brook-street, Grosvenor-square.
- 1847 EDWARD MERYON, M.D. (Lond.), Clarges-street, Piccadilly.
- 1815 AUGUSTUS MEYER, M.D., St. Petersburg.
- 1840 RICHARD MIDDLEMORE, Consulting-Surgeon to the Eye Infirmary, Birmingham.
- 1847 JAMES MILLER, M.D., Welbeck-street, Cavendish-square.
- 1818 \*PATRICK MILLER, M.D. F.R.S. E., Physician to the Devon and Exeter Hospitals, and to the Lunatic Asylum; Exeter, Devonshire.
- 1848 GAVIN MILROY, M.D.
- 1844 NATHANIEL MONTEFIORE, Hyde-park-square, Hyde-park.
- 1828 JOSEPH MOORE, M.D., Physician to the Royal Freemasons' Female Charity; Consulting Physician to Queen Charlotte's Lying-in Hospital; Savile-row, Regent-street. C. 1837.
- 1836 GEORGE MOORE, M.D., Hastings.

*Elected*

- 1848 CHARLES HEWITT MOORE, Surgeon to, and Lecturer on Anatomy at, the Middlesex Hospital; 35, Montague-place, Russell-square.
- 1851 FREDERICK JOHN MOUAT, M.D., Professor of Medicine in the Medical College of Calcutta, and Secretary of the Council of Education in India; Calcutta.
- 1814 \*GEORGE FREDERICK MUHRY, M.D., Hanover.
- 1847 SIMON MURCHISON, Steepleaston, near Woodstock, Oxon.
- 1841 EDWARD WILLIAM MURPHY, M.D., Professor of Midwifery in University College, London; Henrietta-street, Cavendish-square.
- 1845 THOMAS D. MUTTER, M.D., Professor of Surgery in Jefferson Medical College; Philadelphia.
- 1840 ROBERT NAIRNE, M.D., *Treasurer*, Physician to, and Lecturer on Medicine at, St. George's Hospital; Charles-street, Berkeley-square. C. 1848.
- 1835 THOMAS ANDREW NELSON, M.D., Nottingham-terrace, New-road.
- 1843 EDWARD NEWTON, Howland-street, Fitzroy-square.
- 1851 JAMES NICHOLS, Savile-row, Regent-street.
- 1816 THOMAS NIXON (Army).
- 1819 \*GEORGE NORMAN, Surgeon to the United Hospital and Puerperal Charity; Bath.
- 1849 HENRY BURFORD NORMAN, Surgeon to the St. Marylebone Dispensary, and to the Western Ophthalmic Institution; Duchess-street, Portland-place.
- 1845 HENRY NORRIS, South Petherton, Somerset.
- 1849 \*ARTHUR NOVERRE, Great Stanmore, Middlesex.
- 1847 \*WILLIAM EDWARD CHARLES NOURSE, Bryanston-street, Portman-square.
- 1843 WILLIAM O'CONNOR, George-street, Portman-square.
- 1847 THOMAS O'CONNOR, March, Cambridgeshire.
- 1846 FRANCIS ODLING, Devonshire-street, Portland-place.
- 1822 JAMES ADEY OGLE, M.D. F.R.S., Clinical and Aldrichian Professor of Medicine, Oxford; and Senior Physician to the Radcliffe Infirmary; Oxford.
- 1850 HENRY OLDHAM, M.D., Obstetric Physician to Guy's Hospital; Devonshire-square, Bishopsgate-street.

*Elected*

- 1842 WILLIAM PIERS ORMEROD.
- 1846 \*EDWARD LATHAM ORMEROD, M.D., Old Steyne, Brighton.
- 1847 WILLIAM EMANUEL PAGE, M.D., Physician to, and Lecturer on Medicine at, St. George's Hospital; Curzon-street, May-fair.
- 1847 \*WILLIAM BOUSFIELD PAGE, Surgeon to the Cumberland Infirmary; Carlisle.
- 1840 JAMES PAGET, F.R.S., Assistant-Surgeon to, and Lecturer on General and Morbid Anatomy and Physiology at, St. Bartholomew's Hospital; Henrietta-street, Cavendish-square. C. 1848.
- 1806 \*ROBERT PALEY, M.D., Bishopston-grange, near Ripon, Yorkshire.
- 1836 S. W. LANGSTON PARKER, Surgeon to the Queen's Hospital; Birmingham.
- 1847 NICHOLAS PARKER, M.B., Assistant-Physician to the London Hospital; Microscopical Demonstrator of Morbid Anatomy at the London Hospital School of Medicine; Finsbury-square.
- 1841 JOHN PARKIN, M.D., Thurloe-place, West Brompton.
- 1851 JAMES PART, 7, Camden-road Villas, Camden-town.
- 1828 RICHARD PARTRIDGE, F.R.S., Surgeon to King's College Hospital, and Professor of Anatomy in King's College, London; New-street, Spring-gardens. S. 1832. C. 1837. V.P. 1847.
- 1845 THOMAS BEVILL PEACOCK, M.D., Assistant-Physician to St. Thomas's Hospital; Finsbury-circus, Finsbury-sq.
- 1830 CHARLES P. PELECHIN, M.D., St. Petersburg.
- 1819 JOHN PRYOR PEREGRINE, M.D., Jersey.
- 1839 THOMAS PEREGRINE, M.D. Half Moon-street, Piccadilly.
- 1831 JONATHAN PEREIRA, M.D. F.R.S. F.L.S., Physician to, and Lecturer on Materia Medica at, the London Hospital; Finsbury-square. C. 1844. V.P. 1847.
- 1844 WILLIAM VESALIUS PETTIGREW, M.D., Chester-street, Grosvenor-place.
- 1837 BENJAMIN PHILLIPS, F.R.S., Surgeon to, and Lecturer on Surgery at, the Westminster Hospital; Wimpole-street, Cavendish-square. L. 1841. T. 1847.

*Elected*

- 1814 \*EDWARD PHILLIPS, M.D., Physician to the County Hospital; Winchester, Hampshire.
- 1848 EDWARD PHILLIPS, M.D., Coventry, Warwickshire.
- 1846 FRANCIS RICHARD PHILIP, M.D., Physician to St. Luke's Hospital; Kensington-house, Kensington.
- 1851 \*JAMES HOLLINS PICKFORD, M.D., M.R.I.A., Brighton.
- 1851 JOHN PICTON, M.D.
- 1836 ISAAC PIDDUCK, M.D., Physician to the Bloomsbury Dispensary; Montague-street, Russell-square.
- 1852 GEORGE PILCHER, Harley-street, Cavendish-square.
- 1841 HENRY ALFRED PITMAN, M.D., *Librarian*; Assistant-Physician to, and Lecturer on Materia Medica at, St. George's Hospital; Montague-place, Russell-square.
- 1850 ALFRED POLAND, Assistant-Surgeon to Guy's Hospital, and to the Royal Ophthalmic Hospital; St. Thomas's-street, Southwark.
- 1845 GEORGE DAVID POLLOCK, Surgeon to the North London Eye Infirmary, and Lecturer on Anatomy at St. George's Hospital Medical School; Grosvenor-street, Grosvenor-square.
- 1843 CHARLES POPE, M.D. M.A. F.L.S., Temple Cloud, near Bristol.
- 1846 JEPHSON POTTER, M.D. F.L.S., Oxford-road, Manchester.
- 1840 LEWIS POWELL, John-street, Berkeley-square.
- 1842 JAMES POWELL, M.B. (Lond.), Guildford-street, Russell-square.
- 1851 ROBERT FRANCIS POWER, M.D., Bolton-street, Piccadilly.
- 1839 JOHN PROPERT, New Cavendish-street, Portland-place.
- 1845 JOHN PYLE, Surgeon to the North London Eye Infirmary; Oxford-terrace, Hyde-park.
- 1816 SIR WILLIAM PYM, M.D., Inspector of Hospitals.
- 1830 JONES QUAIN, M.D., Paris.
- 1850 RICHARD QUAIN, M.D., Assistant-Physician to the Hospital for Consumption; Harley-street, Cavendish-square.
- 1835 RICHARD QUAIN, F.R.S., *Treasurer*; Surgeon to University College Hospital, and Professor of Clinical Surgery in University College, London; Cavendish-square. C. 1838. L. 1846. T. 1851.

*Elected*

- 1852 CHARLES BLAND RADCLIFFE, M.D., Henrietta-street, Cavendish-square.
- 1821 HENRY REEDER, M.D., Ridge House, Chipping, Sudbury.
- 1835 G. REGNOLI, Professor of Surgery in the University of Pisa.
- 1846 JAMES REID, M.D., Physician to the Infirmary of St. Giles and Bloomsbury; General Lying-in Hospital, &c., Brook-street, Grosvenor-square.
- 1847 SAMUEL RICHARDS, M.D., Bedford-square.
- 1829 SIR JOHN RICHARDSON, Knt. F.R.S. C.B., Surgeon to the Naval Hospital; Haslar Hospital, Gosport.
- 1849 WILLIAM RICHARDSON, M.D., Radnor-place, Hyde-park.
- 1843 JOSEPH RIDGE, M.D., Dorset-square.
- 1845 BENJAMIN RIDGE, M.D., Putney, Surrey.
- 1852 CHARLES RIDLEY, Charlotte-street, Bedford-square.
- 1852 JOHN ROBERTS, M.D., Physician to the Westminster General Dispensary; Brook-street, Hanover-square.
- 1829 \*ARCHIBALD ROBERTSON, M.D. F.R.S. L. and E., Physician to the General Infirmary, Northampton.
- 1843 GEORGE ROBINSON, M.D., Newcastle-on-Tyne.
- 1851 RICHARD RADFORD ROBINSON, Camberwell, Surrey.
- 1852 W. T. CHRISTOPHER ROBINSON, Surgeon-Major, Coldstream Guards; Vincent-square, Westminster.
- 1843 WILLIAM RODEN, M.D. F.L.S., Kidderminster.
- 1835 GEORGE HAMILTON ROE, M.D., Physician to, and Lecturer on Medicine at, the Westminster Hospital; Upper Brook-street, Grosvenor-square. C. 1841.
- 1836 ARNOLD ROGERS, Hanover-square.
- 1846 WILLIAM RICHARD ROGERS, M.D., Berners-street, Oxford-street.
- 1819 HENRY SHUCKBURGH ROOTS, M.D., Consulting-Physician to St. Thomas's Hospital; Russell-square. C. 1833. V.P. 1834.
- 1829 WILLIAM SUDLOW ROOTS, Kingston, Surrey.
- 1850 GEORGE ROPER, 180, Shoreditch.
- 1836 RICHARD ROSCOE, M.D., Twickenham, Middlesex.
- 1836 \*CALEB BURRELL ROSE, Swaffham, Norfolk.
- 1850 ARCHIBALD COLQUHOUN ROSS, M.D., Madeira.
- 1849 CHARLES HENRY FELIX ROUTH, M.D., Dorset-square.

*Elected*

- 1845 HENRY MORTIMER ROWDON, Baker-street, Portman-square.  
 1841 RICHARD ROWLAND, M.D., Assistant-Physician to the  
 Charing-cross Hospital; Woburn-place, Russell-square.  
 1845 JAMES RUSSELL, M.D., Physician to the General Dispensary,  
 Birmingham.  
 1851 HENRY HYDE SALTER, M.B., Montague-street, Russell-sq.  
 1827 \*THOMAS SALTER, F.L.S., Poole, Dorsetshire.  
 1844 \*THOMAS BELL SALTER, M.D. F.L.S., Ryde, Isle of Wight.  
 1849 HUGH JAMES SANDERSON, Upper Berkeley-street, Portman-  
 square.  
 1847 WILLIAM HENRY OCTAVIUS SANKEY, M.D. (Lond.),  
 London Fever Hospital, Liverpool-road, Islington.  
 1845 EDWIN SAUNDERS, Surgeon-Dentist to the Queen, and  
 Lecturer on Diseases of the Teeth at St. Thomas's Hos-  
 pital; George-street, Hanover-square.  
 1834 LUDWIG V. SAUVAN, M.D., Warsaw.  
 1840 AUGUSTIN SAYER, M.D., Upper Seymour-street, Portman-  
 square.  
 1824 EDWARD JAMES SEYMOUR, M.D. F.R.S., Charles-street,  
 Berkeley-square. C. 1826. S. 1827. V.P. 1830.  
 1840 WILLIAM SHARP, F.R.S. F.G.S. F.R.A.S., Rugby.  
 1837 WILLIAM SHARPEY, M.D. F.R.S. L. and E., Professor of  
 Anatomy and Physiology in University College, London;  
 Gloucester-crescent, Regent's-park. C. 1848.  
 1836 ALEXANDER SHAW, *Vice-President*; Surgeon to, and Lec-  
 turer on Surgery at, the Middlesex Hospital; Henrietta-  
 street, Cavendish-square. C. 1842. S. 1843.  
 1848 \*EDWARD JAMES SHEARMAN, M.D., Rotherham, Yorkshire.  
 1849 FRANCIS SIBSON, M.D. F.R.S., Physician to St. Mary's  
 Hospital; Brook-street, Grosvenor-square.  
 1848 EDWARD HENRY SIEVEKING, M.D., Assistant-Physician to  
 St. Mary's Hospital; Bentinck-street, Manchester-square.  
 1839 THOMAS HOOKHAM SILVESTER, M.D. High-street, Clapham.  
 1842 JOHN SIMON, F.R.S., Lecturer on Pathology at St. Thomas's  
 Hospital; Lancaster-place, Strand.  
 1821 CHARLES SKENE, M.D., Professor of Anatomy and Surgery;  
 Marischal College, Aberdeen.  
 1827 GEORGE ROBERT SLENE, Bedford.

*Elected*

- 1824 FREDERIC CARPENTER SKEY, F.R.S., Assistant-Surgeon to, and Lecturer on Anatomy at, St. Bartholomew's Hospital; Surgeon to the Northern Dispensary; Grosvenor-street, Grosvenor-square. C. 1828. L. 1829. V.P. 1841.
- 1838 HENRY SMITH, Senior Assistant-Surgeon to St. Mary's Hospital; and Lecturer on Surgery in the Medical School adjoining St. George's Hospital; Upper Seymour-street, Portman-square.
- 1835 JOHN GREGORY SMITH, Harewood, Yorkshire.
- 1843 ROBERT WILLIAM SMITH, M.D. M.R.I.A., Professor of Surgery in the University of Dublin; Surgeon to the Richmond Hospital; Dublin.
- 1852 CHARLES CASE SMITH, Senior-Surgeon to the Suffolk General Hospital; Bury St. Edmunds, Suffolk.
- 1845 WILLIAM SMITH, Park-street, Bristol.
- 1847 WILLIAM SMITH, M.D., Weymouth, Dorsetshire.
- 1850 WILLIAM TYLER SMITH, M.D., Physician-Accoucheur to St. Mary's Hospital; Upper Grosvenor-street, Grosvenor-square.
- 1843 JOHN SNOW, M.D., Sackville-street, Piccadilly.
- 1819 \*GEORGE SNOWDEN, Ramsgate, Kent.
- 1851 JOHN SODEN, Surgeon to the Bath Hospital; Bath.
- 1816 \*JOHN SMITH SODEN, New Sidney-place, Bath.
- 1830 SAMUEL SOLLY, F.R.S., Senior Assistant-Surgeon to St. Thomas's Hospital; St. Helen's-place, Bishopsgate-street. L. 1838. C. 1845. V.P. 1849.
- 1844 FREDERICK ROBERT SPACKMAN, M.B., Harpenden, St. Alban's.
- 1834 JAMES SPARK, Newcastle, Staffordshire.
- 1851 ROBERT JOHN SPITTA, M.B., Clapham, Surrey.
- 1843 \*STEPHEN SPRANGER, Grantham, Lincolnshire.
- 1838 GEORGE JAMES SQUIBB, Orchard-street, Portman-square.
- 1815 EDWARD STANLEY, F.R.S., Surgeon to St. Bartholomew's Hospital; Brook-street, Grosvenor-square. C. 1821. S. 1824. V.P. 1827. T. 1832. P. 1843.
- 1851 JAMES STARTIN, Surgeon to the Hospital for Diseases of the Skin, and Lecturer on Cutaneous Disorders at that Institution; Savile-row, Regent-street.

*Elected*

- 1852 SHERARD FREEMAN STATHAM, Assistant-Surgeon to University College Hospital; Mortimer-street, Cavendish-sq.
- 1852 JOHN EDWARD STEPHENS, M.D., 9, Southwick-crescent, Hyde-park.
- 1842 ALEXANDER PATRICK STEWART, M.D., Assistant-Physician to, and Lecturer on Materia Medica at, the Middlesex Hospital; Grosvenor-street, Grosvenor-square.
- 1843 ROBERT REEVE STORKS.
- 1844 JOHN SOPER STREETER, Harpur-street, Red Lion-square.
- 1847 WILLIAM ALLEN SUMNER, Surgeon to the Portland Town Free Dispensary; Abbey-road, St. John's-Wood.
- 1839 ALEXANDER JOHN SUTHERLAND, M.D. F.R.S., Physician to St. Luke's Hospital; Parliament-street, Westminster. C. 1850.
- 1842 JAMES SYME, Professor of Clinical Surgery in the University of Edinburgh; Charlotte-square, Edinburgh.
- 1844 RICHARD WILLIAM TAMPLIN, Surgeon to the Royal Orthopædic Hospital; Old Burlington-street.
- 1848 THOMAS HAWKES TANNER, M.D., Physician to the Hospital for Women, Red Lion-square; Charlotte-street, Bedford-square.
- 1840 THOMAS TATUM, Surgeon to, and Lecturer on Surgery at, St. George's Hospital; George-st., Hanover-sq. C. 1852.
- 1835 JOHN COLLEY TAUNTON, Surgeon to the City of London Truss Society; and to the City Dispensary; Hatton-garden, Holborn. C. 1840.
- 1845 THOMAS TAYLOR, Vere-street, Cavendish-square.
- 1845 \*EVAN THOMAS, Manchester.
- 1839 SETH THOMPSON, M.D., Physician to, and Lecturer on Medicine at, the Middlesex Hospital; Lower Seymour-street, Portman-square. C. 1849. S. 1850.
- 1842 THEOPHILUS THOMPSON, M.D. F.R.S., Physician to the Hospital for Consumption and Diseases of the Chest; Bedford-square.
- 1852 HENRY THOMPSON, 16, Wimpole-street, Cavendish-square.
- 1835 FREDERICK HALE THOMSON, Berners-street, Oxford-street.
- 1819 JOHN THOMSON, M.D. F.L.S., Physician to the Finsbury Dispensary; Dalby-terrace, Islington. C. 1833. L. 1834. V.P. 1850.

*Elected*

- 1850 ROBERT DUNDAS THOMPSON, M.D., Professor of Chemistry, University of Glasgow.
- 1836 JOHN THURNAM, M.D., Devizes, Wiltshire.
- 1848 EDWARD JOHN TILT, M.D., Physician to the Farringdon Dispensary; York-street, Portman-square.
- 1834 ROBERT BENTLEY TODD, M.D. F.R.S., Physician to King's College Hospital, Professor of Physiology and of General and Morbid Anatomy in King's College, London; New-street, Spring-gardens. L. 1842. T. 1850.
- 1828 JAMES TORRIE, M.D., Aberdeen.
- 1843 JOSEPH TOYNBEE, F.R.S., Surgeon to the St. George's and St. James's Dispensary, and Aural Surgeon to St. Mary's Hospital; Savile-row, Regent-street.
- 1850 SAMUEL JOHN TRACY, Surgeon-Dentist to St. Bartholomew's and Christ's Hospitals; Finsbury-place, Finsbury-square.
- 1808 BENJAMIN TRAVERS, F.R.S., Surgeon Extraordinary to the Queen, Surgeon in Ordinary to His Royal Highness Prince Albert; Green-street, Grosvenor-square. C. 1810. V.P. 1817. P. 1827.
- 1841 MATTHEW TRUMAN, M.D., Norland-square, Notting-hill.
- 1835 JOHN CUSSON TURNER, M.D., Brighton.
- 1845 THOMAS TURNER, Surgeon to the Royal Manchester Infirmary, and Lecturer on Anatomy; Mosley-street, Manchester.
- 1846 ALEXANDER URE, Surgeon to the Westminster General Dispensary, and to St. Mary's Hospital; Henrietta-street, Cavendish-square.
- 1819 BARNARD VAN OVEN, M.D., Consulting Surgeon to the Charity for Delivering Jewish Lying-in Women; Gower-street, Bedford-square.
- 1806 BOYER VAUX, M.D.
- 1839 WILLIAM RANDALL VICKERS, Baker-street, Portman square.
- 1810 JAMES VOSE.
- 1828 BENEDETTO VULPES, M.D., Physician to the Hospital of Aversa, and to the Hospital of Incurables, Naples.
- 1841 ROBERT WADE, Surgeon to the Westminster General Dispensary; Dean-street, Soho.
- 1823 WILLIAM WAGNER, M.D., Berlin.

*Elected*

- 1820 THOMAS WALKER, M.D., Physician to the Forces; Lower Seymour-street, Portman-square.
- 1852 WALTER HAYLE WALSH, M.D., Professor of the Theory and Practice of Medicine in University College, and Physician to University College Hospital; 40, Queen Anne-street, Cavendish-square.
- 1851 HENRY HAYNES WALTON, Assistant-Surgeon to St. Mary's Hospital; Brook-street, Hanover-square.
- 1852 DANIEL WANE, M.D., 20, Grafton-street, Berkeley-square.
- 1846 NATHANIEL WARD, Assistant Surgeon to and Demonstrator of Anatomy at, the London Hospital; Broad-street-buildings, City.
- 1845 THOMAS OGIER WARD, M.D., Leonard-place, Kensington.
- 1821 WILLIAM TILLEARD WARD, York-place, Portman-square.
- 1846 JAMES THOMAS WARE, Surgeon to the Finsbury Dispensary; and to the Convalescent Institution, Russell-square.
- 1811 JOHN WARE, Clifton, near Bristol.
- 1814 MARTIN WARE, Russell-square. C. 1844. T. 1846.
- 1816 \*CHARLES BRUCE WARNER, Cirencester, Gloucestershire.
- 1829 ELIAS TAYLOR WARRY, Wimborne, Dorsetshire.
- 1837 THOMAS WATSON, M.D., Henrietta-street, Cavendish-square. C. 1840. V.P. 1845. C. 1852.
- 1847 \*THOMAS WATSON, Holbeach, Lincolnshire.
- 1840 WILLIAM WOODHAM WEBB, Gislegham, near Thwaite, Suffolk.
- 1842 FREDERIC WEBER, M.D., Physician to the St. George's and St. James's Dispensary; Norfolk-street, Park-lane.
- 1835 JOHN WEBSTER, M.D. F.R.S., Consulting Physician to the St. George's and St. James's Dispensary; Brook-street, Grosvenor-square. C. 1843.
- 1844 WILLIAM WEGG, M.D., Physician to the St. George's and St. James's Dispensary; Maddox-street, Hanover-square.
- 1816 SIR AUGUSTUS WEST, Knt., Deputy-Inspector of Hospitals to the Portuguese Forces; Paris.
- 1842 CHARLES WEST, M.D., Physician-Accoucheur to, and Lecturer on Midwifery at St. Bartholomew's Hospital; and Physician to the Hospital for Sick Children; Wimpole-street, Cavendish-square.
- 1841 THOMAS WEST, M.D. F.L.S., Daventry.

*Elected*

- 1828 JOHN WHATLEY, M.D.  
 1849 JOHN WHITE, the Albany, Piccadilly.  
 1852 JOHN WIBLIN, 73, Morland-place, Southampton.  
 1840 JOSEPH WICKENDEN, Birmingham.  
 1824 \*WILLIAM JOHN WICKHAM, Surgeon to the Winchester Hospital; Winchester.  
 1844 FREDERICK WILDBORE, High-street, Shoreditch.  
 1837 GEORGE AUGUSTUS FREDERICK WILKS, M.D., Temple-walk, Matlock, Derbyshire.  
 1840 CHARLES JAMES BLASIUS WILLIAMS, M.D. F.R.S., Upper Brook-street, Grosvenor-square. C. 1849.  
 1829 ROBERT WILLIS, M.D., Barnes, Surrey. L. 1838.  
 1839 ERASMUS WILSON, F.R.S., Consulting Surgeon to the St. Pancras Infirmary; Henrietta-street, Cavendish-square.  
 1839 JAMES ARTHUR WILSON, M.D., Physician to St. George's Hospital; Dover-street, Piccadilly. C. 1846.  
 1831 WILLIAM JAMES WILSON, Surgeon to the Manchester Infirmary; Manchester.  
 1850 \*ROBERT STANTON WISE, M.D., Banbury, Oxon.  
 1825 THOMAS ALEXANDER WISE, India.  
 1851 JOHN WOOD, Old Burlington-street.  
 1841 GEORGE LEIGHTON WOOD, Surgeon to the Bath Hospital; Queen-square, Bath.  
 1848 WILLIAM WOOD, M.D., Resident Medical Officer, Bethlem Hospital.  
 1843 JOHN WARD WOODFALL, M.D., Assistant-Physician to the Westminster Hospital; Davies-street, Berkeley-square.  
 1847 ROBERT WOOLLASTON, Conduit-street, Westbourne-terrace.  
 1833 THOMAS WORMALD, Assistant-Surgeon to St. Bartholomew's Hospital; Bedford-row. C. 1839.  
 1842 WILLIAM COLLINS WORTHINGTON, Surgeon to the Infirmary, Lowestoft, Suffolk.  
 1848 EDWARD JOHN WRIGHT, Kennington-row, Kennington.

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It is particularly requested, that any change of Title or Residence may be communicated to the Secretaries before the 1st of August in each year, in order that the List may be made as correct as possible.]

## HONORARY FELLOWS.

(Limited to Twelve.)

*Elected*

- 1841 WILLIAM THOMAS BRANDE, F.R.S. L. and ED., Professor of Chemistry at the Royal Institution of Great Britain; Royal Mint, Tower-hill.
- 1835 SIR DAVID BREWSTER, K.H. LL.D. F.R.S. L. and E., &c., Cor. Mem. Institute of France, &c.; Kingussie.
- 1841 ROBERT BROWN, D.C.L. F.R.S., Vice-President of the Linnean Society; British Museum.
- 1835 The Very Rev. WILLIAM BUCKLAND, D.D. F.R.S., Dean of Westminster.
- 1847 EDWIN CHADWICK, Commissioner of the Board of Health.
- 1835 MICHAEL FARADAY, D.C.L. F.R.S., Cor. Memb. Institute of France; Royal Institution.
- 1841 SIR JOHN FREDERICK WILLIAM HERSCHEL, Bart., D.C.L. F.R.S., President of the Royal Astronomical Society; Somerset-House.
- 1835 SIR WILLIAM JACKSON HOOKER, LL.D. F.R.S. L. and E., Royal Botanic Garden, Kew.
- 1847 RICHARD OWEN, F.R.S., Cor. Memb. Institute of France; Hunterian Professor to, and Curator of the Museum of, the Royal College of Surgeons of England.
- 1835 The Rev. ADAM SEDGWICK, A.M. F.R.S. &c., Woodwardian Lecturer, Cambridge.
- 1841 The Rev. WILLIAM WHEWELL, D.D. F.R.S., Master of Trinity College, Cambridge.

## FOREIGN HONORARY FELLOWS.

(Limited to Twenty-four.)

*Elected*

- 1841 G. ANDRAL, M.D., Professor in the Faculty of Medicine, Paris.
- 1815 PAOLO ASSALINI, M.D., Professor of Surgery, and Chief Surgeon to the Military Hospital at Milan, &c.
- 1835 CARL JOHAN ECKSTRÖM, K.P.S. and W., Physician to the King of Sweden, First Surgeon to the Seraphim Hospital, Stockholm.
- 1835 W. J. EDWARDS, M.D. F.R.S., Member of the Institute of France, Paris.
- 1841 CHRISTIAN GOTTFRIED EHRENBERG, Berlin.
- 1835 BARON A. DE HUMBOLDT, Member of the Institute of France, &c., Berlin.
- 1841 JAMES JACKSON, M.D., Professor of Medicine in the University of Cambridge, Boston, U.S.
- 1843 BARON JUSTUS LIEBIG, M.D. F.R.S., Professor of Chemistry in the University of Giessen, &c.
- 1841 P. C. A. LOUIS, M.D., Physician to the Hôtel-Dieu, Member of the Royal Academy of Medicine, &c., Paris.
- 1841 F. MAGENDIE, M.D., Member of the Institute; Physician to the Hospital of the Salpêtrière; Paris.
- 1847 PROFESSOR CARLO MATTEUCCI, University of Pisa.
- 1841 JOHANN MULLER, M.D., Professor of Anatomy and Physiology, and Director of the Royal Anatomical Museum, Berlin.
- 1835 J. C. OERSTED, M.D., Professor of Physics in the University of Copenhagen, &c. &c.
- 1835 PROFESSOR ORFILA, Dean of the Faculty, &c. &c., Paris.
- 1841 BARTOLOMEO PANIZZA, M.D., Pavia.
- 1850 CARL ROKITSANSKY, M.D., Curator of the Imperial Pathological Museum at the University of Vienna, &c. &c.

*Elected*

- 1843 PHILIBERT JOSEPH ROUX, Member of the French Institute ;  
Surgeon-in-Chief of the Hôtel-Dieu; Professor in the  
Faculty of Medicine, Paris,
- 1835 C. J. TIMMINCK, Director of the Museum of Natural History  
of the King of Holland, Amsterdam.
- 1835 FREDERICK TIEDEMANN, M.D., Professor of Anatomy and  
Physiology, Heidelberg.
- 1841 JOHN C. WARREN, M.D., Professor of Anatomy and Surgery  
in the University of Cambridge, Boston, U.S.

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## ADVERTISEMENT.

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THE Council of the Royal Medical and Chirurgical Society deems it proper to state, that the Society does not hold itself in any way responsible for the statements, reasonings, or opinions set forth in the various papers, which, on grounds of general merit, are thought worthy of being published in its Transactions.

STATISTICAL REPORT  
UPON  
CASES OF DISEASE OF THE HEART  
OCCURRING IN ST. GEORGE'S HOSPITAL,  
ESPECIALLY IN RELATION TO  
RHEUMATISM AND ALBUMINURIA.

BY  
DR. BARCLAY,  
THE MEDICAL REGISTRAR.

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Received Nov. 8th.—Read Nov. 11th, 1851.

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EXAMINATION OF FATAL CASES, IN THEIR RELATION TO  
RHEUMATISM AND ALBUMINURIA.

SINCE drawing up the Report on Valvular Diseases of the Heart, which the Society did me the honour to publish in the 31st Volume of its Transactions, my attention has been a good deal turned to the same subject; and it did seem that some of the questions connected with the pathology of this organ might be elucidated by an accumulation of carefully recorded clinical observations, not in a few selected instances, but throughout the whole range of cases supplied by a large hospital, and thus the appointment I hold, be made subservient to the advancement of science. It is true that the most certain results are those derived from *post-mortem* examination, yet there are circumstances connected with structural change which can only be learned at the bed-side of the patient. We have no means of learning the history of rheumatism after death; and the permanent presence of albumen in the urine during life is of greater importance than structural alterations in the kidney revealed

by dissection. It therefore became a matter of importance that the table of *post-mortem* appearances should only include those whose clinical history was known as having a bearing on these subjects; and hence, patients dying in the medical wards only are considered, and from among these all such are excluded as were brought to the hospital dead or dying, all whose history contains no allusion to disease of the heart during life, and all in which partial evidence of old pericarditis, or specks of atheroma on the valves were found as the only condition of disease after death, which could give rise to no symptoms, and therefore could have no history.

The present communication is not confined to valvular lesion, because pericardial is so bound up with endocardial disease, and both together with alterations in the muscular structure, that it becomes impossible to study one without considering the other morbid changes to which the heart is more or less liable. Some of the deductions differ in a few particulars from those which seemed warranted by the previous collection of cases; and while it is true that my opportunities for obtaining accurate information have been greater, it is also true that the liability to error always increases in an inverse ratio to the number of instances. This circumstance only lays on me the greater obligation to present to the Society this additional Report.

The cases are arranged in the Table in the following order:—1st, cases of acute rheumatism fatal during the rheumatic attack; 2d, cases of recent pericarditis, independent of recent rheumatism; 3d, cases of recent lymph on the valves not previously recorded; 4th, adherent pericardium and extensive old pericarditis, with no recent condition of inflammation; 5th, remaining cases of old valvular disease divided into thickening and atheroma; and, lastly, cases in which alteration in muscular structure was the prominent feature. Under each head rheumatic cases generally stand first, and the rest either in distinct groups or following the order of ages.

1. *Cases of Acute Rheumatism fatal during the Rheumatic Attack.*

Of this there are eight instances. In two of these, supuration had occurred within and around the joints, and it has been questioned whether such are not of a nature somewhat different from ordinary rheumatism; in one of them, however, the pericardial membrane was in the first stage of inflammation, and in the other, both aortic and mitral valves were opaque, a condition which would seem to be allied to inflammation. Five cases are examples of rheumatic pericarditis in its ordinary form, one of which derives interest from the circumstance that no friction sound was ever heard during the continuance of the patient in the hospital, although from the alteration of rhythm it was often listened for, and the pericardium was found filled with recent lymph, and its two layers only very partially adherent to each other; in three of them there was also evidence of previous inflammation of the pericardium.

In three of these cases of pericarditis, distinct evidence was also found of recent endocarditis, associated in two instances with old disease. In the only instance in which recent lymph was found on the valves after a first attack of acute rheumatism, it was confined to the mitral valve. Although it appears that pericarditis existed in a considerably larger proportion of these cases than endocarditis, it does not follow that it is a more common, but only a more immediately dangerous complication of acute rheumatism, because in each instance the obstruction to the circulation consequent upon it, was the chief cause of the fatal termination.

The remaining case is one of great interest; because during life an endocardial murmur at the base of the heart was distinctly made out at an early period of the disease, and yet no valvular lesion existed. The history is shortly this: S. A—, æt. 23, unmarried, catamenia regular, of pretty full habit of body, and good complexion, was seized with pains in her joints on the 17th January, 1850; had

been under treatment since the 19th; and was admitted into the hospital on the 24th with a first attack of acute rheumatism. She complained of some catching in the breathing; and a slight roughness with the first sound of the heart was first heard on the 26th, and a distinct systolic endocardial murmur was heard at the base of the heart on the 28th. She became slightly delirious, with tremulous movements, on the 1st February; the delirium was very violent on the evening of the 2d; and she died comatose on the morning of the 3d. Throughout the case there was great febrile disturbance; the face was flushed and the pulse full and frequent; and after death large clots of recent lymph were found in the synovial cavities. With such a chain of symptoms, it would not have been unreasonable to suppose that a gradually increasing endocardial murmur, heard first on the tenth day of her illness, depended on the presence of vegetation on the aortic valves: and hence its importance, as showing that in the acute stage of rheumatism, with no indications of impoverishment from other causes, the physical properties of the blood may be so altered, as to produce a bruit de soufflet, without any alteration of structure, either within or without the heart.

#### 11. *Recent Pericarditis independent of recent Rheumatism.*

The Table contains sixteen<sup>1</sup> examples of this condition, four of which are associated with traces of old disease. Nos. 9 and 10 seem directly due to inflammation of the peritoneum spreading through the diaphragm,—the one alleged to have been caused by injury; the other known to have supervened on paracentesis abdominis. No. 11 probably owed its origin to extensive and severe pleurisy, with which, at the least, it was associated. In none of these did rheumatism precede or accompany the attack. In No. 10 there

<sup>1</sup> Among the cases omitted in consequence of their having no clinical history, is one of a patient admitted dying of dysentery, in which the only discoverable lesions were extensive ulceration of the large intestine, and pericarditis.

was also albuminuria; and there are besides six cases, Nos. 12—17, in which pericarditis occurred just before death in persons of a cachectic aspect, from long-continued disease of the kidney. It was accompanied in one case by recent pleurisy, and in another by diffuse cellular inflammation; these had never had rheumatism; in one no record has been kept, while in another there had been a rheumatic attack eight months before admission, and in this case only was the pericarditis of very severe character. In the remaining case, No. 13, the patient had suffered from acute rheumatism twenty-six years before, with probably corresponding disease of the mitral valve; but there had been no recent attack.

In No. 18, none of the preceding causes was in operation; he had never suffered from rheumatism, the urine was not albuminous, and there was no where else inflammation of the serous membranes; but there was lymph on the endocardium and valves, with congenital malformation, and, as the most prominent feature of the case during life, tumultuous action of the heart. It was pointed out in the former report, that malformation of the valves almost always leads to further changes, an observation I am glad to find confirmed by Dr. Ormerod,<sup>1</sup> and in these cases it would appear that the exciting cause is the increased action induced by an impeded, and especially regurgitant circulation. The same principle probably applies to the pericardium; and in closely watching those fatal cases of albuminuria which have been associated towards their close with pericarditis, it has seemed to me that the turbulent action of the heart has played a most important part in developing the disease. Indeed, it must be evident that albuminuria acts more especially in establishing a predisposition to serous inflammations, and in this, differs entirely from rheumatism, which, for the most part, acts directly as an exciting cause of cardiac inflammation, and within certain limits, in proportion to its severity. In No. 16 it is probable that the albuminuria had less to do with the pericarditis than the general disturbance

<sup>1</sup> Gulstonian Lectures at the College of Physicians, anno 1851.

to the circulation, caused by the altered relations of the chest to the heart and great vessels, in consequence of spinal curvature, which gave rise to a loud systolic murmur, for which no other cause was found after death, as the heart was free from valvular lesion. Another case also deserves notice, from the circumstance that the condition of albuminuria with which the pericarditis was associated, appeared to depend on scirrhus obstruction to the ureters, giving rise to dilatation and dwindling of the kidneys.

In the four cases in which old and recent inflammation are found associated, no especial cause for its occurrence demands notice; but if it were true that old inflammation acted as a predisposing cause of a fresh attack, it ought, perhaps, to have been found in a larger number of the cases given in this Table.

Four cases of pericarditis next claim our attention, in which the deposit of lymph was not quite recent. In Nos. 24 and 26, there is a history of rheumatic fever occurring in the one twenty-five, and in the other six years before, with no subsequent recurrence; they were free from symptoms referable to the heart until after what was described as a "severe cold" with pain in the chest at four and six months before admission; both were unhealthy subjects, and one had disease of the kidney. In No. 25 there would appear to be nothing to fix the date. In No. 27 there is also chronic thickening of the membrane indicating a previous attack, both apparently corresponding to *post-mortem* appearances of two successive attacks of peritonitis, during the latter of which she was under observation, but the existence of pericarditis, if present at that time, was not observed.

#### 111. *Recent Endocarditis independent of recent Rheumatism.*

There are four instances in which, without any evidence of previous inflammatory action, recent lymph was found on the valves; in Nos. 18 and 28 associated with malformation of the aortic valves; in Nos. 21, 28, and 29, with disease of the kidney; and in No. 24, with a report of acute rheumatism

six years before, of which, however, no trace had been left in any alteration of structure about the heart.

There are seven cases in which recent lymph was found associated with previously existing disease of the valves; in No. 17 alone, is there no history of rheumatism; in Nos. 21 and 32 there was calcareous deposit, and it may be questioned whether such a condition can be traced to acute rheumatism as its source, but in the others, the probability is fair, that the primary disease was rheumatic endocarditis; and it is remarkable how much more frequently the thickening, arising out of this condition, is associated with recent inflammatory action than any other form of old valvular lesion. It was associated, in one case, with an attack of pleurisy; in another, with acute bronchitis; two had albuminous urine, but did not exhibit an advanced state of disease of the kidney.

In two cases lymph was found, "not quite recent," on the valves, Nos. 35, 36, probably corresponding to rheumatic attacks, which were reported to have occurred some months before death. In both of these the deposit was found only on the mitral valve; as was also the case in the only instance, No. 4, in the Table, of rheumatic endocarditis without previous thickening. Of the two cases in which malformation existed, No. 18 had recent lymph on both sets of valves, and No. 28 only on the aortic. In the two cases combined with albuminuria, recent lymph was found in one on the mitral, and in the other on the aortic valves. Among the cases in which recent lymph was found associated with old disease of rheumatic origin, it occurs in three instances on both sets of valves, in three, on the aortic alone, in two, on the mitral alone. The only case in which old thickening and recent lymph were found together, without rheumatism, No. 17, had both conditions limited to the mitral valve.

#### IV. *Old Pericarditis.*

In a large proportion of the *post-mortem* examinations, traces of old inflammation of the pericardium are recorded;

in some, the membrane being universally adherent, while in others the adhesions were more or less limited, or patches of partially absorbed fibrin were observed on its surface. In very many instances clinical history fails to throw any light on the origin of these attacks, and we can do little beyond inquiring in what proportion there is a history of previous rheumatism, or evidence of albuminuria; although it must be remembered that it does not follow, even when present, that either was the efficient cause of the attack.

Traces of previous inflammation are found in eleven out of twelve cases reported to have suffered from acute rheumatism; and in twelve out of thirty-one reported to have suffered from any kind of rheumatism whatever; but the single instance (69) associated with slight rheumatism is of very trivial character. In all the cases in which it is associated with a distinct history of acute rheumatism, the pericarditis appears to have been of considerable extent. There are fifteen other instances of severe old pericarditis, thirteen of which are reported never to have suffered from rheumatism.

There are six cases in which the pericardium was universally, firmly adherent; one with a history of acute rheumatism five years before, one in which there is no history of rheumatism, with malformation of the aorta and old pleurisy, and four who never had rheumatism, in three of which the kidney was diseased, two had old pleurisy, and one old peritonitis. In three cases, the adhesions were nearly universal with histories of acute rheumatism, one having also had pleurisy. In seventeen cases the pericarditis was considerable, but there were either no adhesions, or they were very slight: six of these correspond to histories of acute rheumatism; one had rheumatic fever only six months before, with very old pericarditis, and also aneurism of the aorta; in one there was old pleurisy, with no history regarding rheumatism, and nine are said never to have suffered from it. Of the last, it was associated in four instances with disease of the kidney, in four with more or less severe pleurisy, one with peritonitis, one with aneurismal dilatation of the heart, and in one no distinct cause was observed.

It is worthy of remark, that while all the cases of rheumatic pericarditis appear to have been severe, only one has distinctly terminated in complete adhesion; and on the contrary, the majority of the cases of adherent pericardium occur among persons who have never suffered from rheumatism at all. This series of cases does not seem to indicate that complete adhesion is the most favorable termination of the attack, whether the ages of the patients or the condition of the heart be taken as an indication.

#### v. *Valvular Lesion.*

If it be true that very many cases of pericarditis take their rise independently of acute rheumatism, the same fact is only more plainly indicated in regard to valvular lesion. After the admirable lectures on this part of the subject delivered by Dr. Ormerod in the present year, I shall do little more than point out wherein the present series of cases differs from that which I formerly collected.

Including recent cases with those of longer standing, there are in the table sixty-two cases of valvular lesion; of which—

- 23 are associated with a history of acute rheumatism; but in three of these the lesion did not appear to be of rheumatic origin.
- 26 occur in persons who never had suffered from rheumatism at all.
- 8 are cases (chiefly of slight disease) in which no record on this subject has been kept.
- 2 are associated only with slight rheumatism, in which the lesion does not appear to have had an inflammatory origin.
- 1 was said to have been "slight rheumatism," and
- 1 said to have been "gout," in each of which the probability is, that the disease was primarily rheumatic endocarditis.
- 1 was hereditary gout with a deposit of lithate of soda on the valves.

There are therefore twenty cases in which we may be tolerably certain that the disease was rheumatic, and twenty-six in which it was positively denied that the individual had ever suffered from rheumatism at all. From these two classes we obtain the following numbers as representative of the liability to disease of the aortic and mitral valves:

	Rheumatic.	Non-Rheumatic.
Disease affecting both sets of valves . . .	12	10
Disease of mitral valve alone . . .	7	11
Disease of aortic valve alone . . .	1	5

Whence it appears, that there is a greater liability in rheumatic cases to simultaneous lesion of both sets of valves, as well as a greater preponderance of disease of the mitral over the aortic valves in them, than in non-rheumatic cases.

This may be further illustrated by examining more closely the cases in which both valves are implicated. It appears that one valve is described as being in a more advanced state of disease than the other in five of the twelve rheumatic cases, and only twice among the ten non-rheumatic; in the former it is always the mitral that is most affected, in the latter it occurs once in each set of valves. Again, we have found in the recent cases, that when not associated with previous thickening, the lymph was always found on the mitral valve in rheumatic cases, while in non-rheumatic or doubtful cases it was twice found on the aortic valves, and once on the mitral. In the majority of instances, therefore, in this table, rheumatic endocarditis was first marked by a deposit of lymph on the mitral valves, followed by thickening and contraction; and there, with or without a renewed attack of acute rheumatism, inflammation was again readily set up, spreading in most instances also to the aortic valves.

Of nineteen instances in which a history of rheumatic fever some years previously was distinctly made out, fifteen indicate severe valvular lesion of long standing. In three of these, atheromatous or calcareous deposit was found along with old thickening; in which it must always be to a certain extent doubtful, whether the atheromatous disease have arisen out of the purely inflammatory alteration in texture, produced by acute rheumatism, or out of those independent conditions, from which it more generally originates. In the one view, the thickening would be the primary lesion; in the other, it would only be secondary. And this series

appears, like my former collection of cases, to contain examples of both conditions. In almost all the cases in which recent lymph is found in addition to old standing disease, a history of having at one time or other suffered from acute rheumatism is obtained.

With regard to the association of albuminuria and valvular lesion, it may be stated generally, that, taking into consideration all conditions of disease of the valves, there were found,—

In 22 instances, diseased kidney, with albuminous urine ;  
in 26 instances, healthy kidney; and  
in 13 instances, evidences of disease, which were more or less obscure.

The tricuspid valves are stated to have been diseased in ten instances. In six they were thickened; three being associated with a history of acute rheumatism, and two with Bright's disease. In two instances these valves were affected with atheroma; in one they were opaque; and in one atrophied. In the last instance the pulmonic valves were also affected with atrophy. No other instance of disease of these last occurs in the Table.

#### VI. *Hypertrophy and Dilatation.*

Scarcely a single instance occurs in the Table of old lesion of the valves or pericardium, in which alterations are not found in the thickness of the walls, or the dimensions of the cavities of the heart. But these are not the only causes of change: atheromatous degeneration of the arterial coats exerts considerable influence; and the rationale of this is simple enough. It implies the loss of one of those conditions of health, which are the most favorable to the onward flow of the blood; and hence arises either accumulation of blood in the heart, in the form of dilatation, or, what is much more common, a compensating power in increased thickness of its walls, to overcome the retardation. Albuminuria also acts as a cause of alteration, chiefly in the direction of hypertrophy; but it is one for which it is very

difficult to find a reasonable explanation. It is not that disease of the kidney first makes itself felt in valvular lesion, or inflammation of the pericardium, and only secondarily in alteration of dimension; but the two conditions are so often found coincident, when clinical investigation and post-mortem examination alike fail to detect any other cause for the disturbance of the circulation, that we cannot withhold our assent to the proposition, that they bear some relation to each other. Some idea may be formed of the frequency of this association, from the circumstance that in going over the post-mortem records at this hospital for a period of about three years, I find 141 cases in which the kidney is noted evidently diseased; and among these hypertrophy is noted as occurring 55 times, and dilatation 36 times, either together or separately, in sixty-three individuals, while there are only seventy-eight instances, very little more than half, in which the heart has retained its natural dimensions.

These alterations are less easily recognised during life, than when complicated with valvular lesion; and consequently these two causes, (although always stated when present in cases finding place in this Table,) may not be enumerated so frequently as they actually occur in proportion to other lesions having a similar tendency. Nevertheless an attempt may be made by placing them in a tabular form to show their several relations to conditions of greater or less hypertrophy and greater or less dilatation.<sup>1</sup>

<sup>1</sup> It is plainly necessary to exclude such lesions of either set of valves as cannot be any impediment to the onward flow of blood, or cause of regurgitation, and also cases of pericarditis, which merely consisted in a patch of old lymph on the surface of the heart. When the amount of disease might or might not have deranged the circulation, the cases are marked as doubtful, and where albuminuria did not exist during life, altered structure of the kidney discovered after death, are also enumerated as doubtful causes of alteration. The last of two numbers placed together includes these doubtful cases.

One case of aneurismal dilatation, one of aneurism of the aorta, and one of congenital constriction, are excluded.

	Simple hypertrophy.	Considerable hypertrophy, comparatively little dilatation.	Great hypertrophy, with great dilatation.	Moderate hypertrophy, with moderate dilatation.	Considerable dilatation, with little hypertrophy.	Great dilatation, with more or less hypertrophy.	Simple dilatation.
Number of cases	15	6	3	17	7	10	12
Adhesions of peri- cardium . . . }	1	3 or 5 ?	2 or 3 ?	3	2 or 3 ?	2	4 or 6 ?
Disease of aortic valves . . . }	4	2	1 or 2 ?	3 or 4 ?	3 or 4 ?	4 or 5 ?	2 or 4 ?
Disease of mitral valves . . . }	3 or 4 ?	3	1 ?	8 or 9 ?	2 or 3	6	5 or 6 ?
Atheroma of aorta	9	3	1	6	2	1	1
Disease of kidney	9 or 11 ?	3	2	11	2 or 3 ?	3	3 or 6 ?
None of the above causes . . . }	1	1	0	0	0	1	2

It would appear from this arrangement of the cases, that disease of the aortic valves is rather more associated with hypertrophy than dilatation, the latter occurring chiefly with regurgitation, while disease of the mitral valve is more decidedly associated with dilatation. Adhesions of the pericardium are also more associated with dilatation than with hypertrophy. Atheroma of the aorta and disease of the kidney, each accompany a large majority of the cases of simple hypertrophy, and the former in particular seems to have very little to do with cases of dilatation. Of course it is impossible to assign to each, among so many causes of change, its own particular value, except in a very general manner, when the two states are conjoined.

#### GENERAL STATISTICAL RELATIONS OF RHEUMATISM TO DISEASE OF THE HEART.

The whole number of patients admitted into the medical wards of any large general hospital would very soon supply an accurate basis for statistical relations between two diseases of such common occurrence as rheumatism and disease of

the heart, were the facts but sufficiently simple, or capable of being resolved into elements on which reliance could be placed. But we are unfortunately, as yet, in ignorance of the essential element of rheumatism, and the most practised ear may be deceived in a diagnosis of disease of the heart. In entering on such a field it therefore becomes necessary to select such definitions as may, at least, be intelligible, and by acknowledging the sources of fallacy, and endeavouring to exclude the cases affected by them, to obtain credit for accuracy in the remainder. For the purposes of the present inquiry, rheumatism has been simply divided into acute, subacute, and chronic, because the first is that especially in which cardiac inflammation is liable to occur.

I have adopted for acute rheumatism, the somewhat antiquated definition of inflammation, "*rubor et tumor, cum calore et dolore.*" If all these be present, gout being excluded, the case is classed as one of the acute form; if redness be absent, unless there be very marked febrile disturbance, or rapid transition from one joint to another, mere puffiness and tenderness are only taken as evidence of a subacute form,<sup>1</sup> to which is also consigned the whole class

<sup>1</sup> I believe I have erred on the side of too great exclusiveness, because, until very recently, I had never seen inflammation of the heart *commence* in the subacute form; and no such case occurs among the reports on which this paper is based. Hospital practice is not the most favorable for ascertaining such a point, and the advantage of increased accuracy was not lightly to be thrown aside, when the facts seemed to warrant the conclusion that inflammatory action was restricted to the acute form. The doubtful cases are few: one, a lad of 17, suffering also from phthisis, who had been ill only a week, but had been obliged to keep his bed the whole time, admitted with a first attack of rheumatism, not presenting any symptom of an acute form, save a quick and excited action of the heart, with a *bruit de soufflet* heard, first over the aortic valves, and two or three days later more loudly towards the apex, and persistent. Another, a lad of 15, who had been suffering from rheumatism for six weeks before admission, and had palpitation of the heart, according to his own account, some weeks previously, having only experienced a very slight attack of rheumatism four years before, he was believed to have disease of the aortic valves. In addition to these, there were two cases of a first attack of rheumatism, of eight

of what has been called synovial rheumatism. This definition has the advantage of making the question intelligible to the patients themselves whether any rheumatic attack they may have experienced has been acute or not. It is, indeed, difficult to say what relation chronic rheumatism bears to what has been well denominated rheumatic fever; and of subacute rheumatism it may probably be said with truth, that some instances are merely a milder form of the same disease, while others have very little in common with it. In children especially, it is found that great febrile disturbance is often present, indicating true rheumatic fever, with scarcely any external signs of inflammation.

The case already detailed (pages 3-4) shows what caution must be exercised in forming a diagnosis of endocarditis commencing in an attack of rheumatism. The stethoscope will not serve alone for a diagnosis; and therefore, where other signs of endocarditis are wanting, the case must be regarded as doubtful. With pericarditis, the difficulties, though not less, are of a different character; here sometimes the sound is so transient that it is not caught until the roughened surfaces have come into opposition, and one instance has been mentioned (page 3), in which all the requisites being found for its production, except perhaps the presence of fluid, of which there was none, no friction was ever heard. Neither can the ear take cognisance of previous attacks. But once heard and recognised I am not aware of any fallacy that attends the existence of friction as and ten weeks' duration respectively, which, so far as could be ascertained, had probably commenced as acute rheumatism, and had degenerated into the subacute or almost chronic form, in which they were admitted, with cardiac affection. There are also six examples in females suffering from subacute rheumatism, of a *bruit de soufflet* being present with no history of an acute attack, but in these the abnormal sound was believed to be merely functional. In the table of *post-mortem* examinations only one case occurs, where, with a distinct history of rheumatism never of an acute character, the lesions are such as might have been due to rheumatic inflammation of the heart at an earlier period. Quite recently I have met with a case in which pericarditis commenced in an attack altogether unaccompanied by acute symptoms, not included in these statistics.

an indication of pericarditis. Here the error is on the side of omission; in endocarditis the error is on the side of excess.

### 1. *Of Rheumatism generally.*

The cases, of which notes more or less extended have been kept, include 152 of acute rheumatism, 178 subacute, and 358 chronic. Exclusive of doubtful cases, these give severally the following proportions of cardiac complications :

	Total.	With Cardiac Complications.	Per Cent.
Cases of acute rheumatism	152	67	44.0
„ subacute „	178	20	11.2
„ chronic „	358	14	3.9

In all the chronic cases,<sup>1</sup> and in the majority of the subacute, in which the heart was affected, there was a history of previous rheumatism of a more severe character; and in regard to the former, there can be no doubt that the disease was of a date prior to their admission.

The two sections of acute and subacute cases may be arranged in periods of years, indicating the proportion for different ages of first and subsequent attacks, and also the number suffering from cardiac complications; but it must be remembered that these are not the ages at which disease of the heart begins.

#### ACUTE ON ADMISSION.

Age on Admission.	No previous Rheumatism.	Have had Rheumatism.	Total.	With Cardiac Complication.	Per Cent.
Under 10 years	2	0	2	1	50.0
over 10 under 15	3	3	6	6	100.0
„ 15 „ 20	21	14	38	20	52.6
„ 20 „ 25	27	15	42	19	45.2
„ 25 „ 30	14	11	25	7	28.0
from 30 to 40	13	16	29	11	37.9
over 40 years	3	7	10	4	40.0

<sup>1</sup> Two cases of chronic rheumatism are omitted, in which, never having had rheumatism previously, old disease of the heart with hypertrophy was found on admission, which could not have had a rheumatic origin.

## SUBACUTE ON ADMISSION.

Age on Admission.	No previous Rheumatism.	Have had Rheumatism.	Total.	With Cardiac Complication.	Per Cent.
Under 10 years	2	0	2	0	0.0
over 10 under 15	3	4	7	4	57.1
„ 15 „ 20	21	18	39	7	17.9
„ 20 „ 25	23	10	33	4	12.1
„ 25 „ 30	22	8	30	2	6.6
from 30 to 40	16	13	29	2	6.9
over 40 years	20	18	38	1	2.6

The chief point of interest here is to observe that the two classes bear pretty nearly the same proportion to different ages up to 25; and subsequently, the numbers suffering for the first time from rheumatism, are very much more frequently found in the subacute than in the acute class. It is also worthy of note, that while cardiac complications generally bear a much larger proportion to the acute than to the subacute cases, the ratio is less dissimilar before 25 years of age than it is after it. These two observations serve to illustrate each other.

II. *Of Acute Rheumatism.*

As a most unquestionable cause of inflammation of the heart and pericardium, it becomes of interest to inquire not only in what proportion of instances, endo- and pericarditis are associated with acute rheumatism, but also if possible to ascertain what influence external circumstances of age and sex have in determining the cardiac affection. For this purpose, it is essential to distinguish first and subsequent attacks of rheumatic fever, because when an endocardial murmur is heard, it is not always possible to determine whether it depend upon recent or on old disease, and knowledge of a previous attack admits the possibility at least of its having a prior existence. The proportions will be best seen in a tabular arrangement:

Cases of a first attack of acute rheumatism	.	.	.	.	88
Males	.	.	.	.	38
Cases of endo- and pericarditis	14	.	36.9	per cent.	
Doubtful cases	4	.	10.5	"	
Cases with no cardiac affection	20	.	52.6	"	
Females	.	.	.	.	50
Cases of endo- and pericarditis	22	.	44.0	per cent.	
Doubtful cases	9	.	18.0	"	
Cases with no cardiac affection	19	.	38.0	"	
Cases of a subsequent attack of acute rheumatism	.	.	.	.	64
Males	.	.	.	.	38
Cases of endo- and pericarditis, or of old disease	17	.	44.7	per cent.	
Doubtful cases	5	.	13.2	"	
Cases with no cardiac affection	16	.	42.1	"	
Females	.	.	.	.	26
Cases of endo- and pericarditis, or of old disease	14	.	53.9	per cent.	
Doubtful cases	3	.	11.5	"	
Cases with no cardiac affection	9	.	34.6	"	
All cases together :	.	.	.	.	152
Cases of endo- and pericarditis, or of old disease	67	.	44.1	per cent.	
Doubtful cases	21	.	13.8	"	
Cases with no cardiac affection	64	.	42.1	"	

From this Table it will be seen that among this collection of cases there is a greater proportion of females than of males admitted with a first attack, and *vice versa*, a larger proportion of males with a subsequent attack; whence we may conclude, if these proportions hold generally true, that on the whole, females are somewhat more liable to the disease than males, but that the latter are more exposed to its recurrence. Similarly, it appears that females are in a small proportion more liable to cardiac complication than males: that this excess is not due to functional murmurs being mistaken for endocarditis is proved by the fact, that in twenty-eight of the sixty-seven cases of heart affection, pericardial friction was noted, and of these eighteen were females, and only ten males. As might have been anticipated, the proportion of cases with old or recent disease of the heart is

increased in the subsequent attacks, about 18 or 20 per cent., so that of patients who have escaped in their first seizure, one in five may be expected to suffer from it in any subsequent attack.

The influence of age is considerable, but not so great as mere post-mortem evidence led me formerly to conclude. Excluding the doubtful cases, we derive the following proportions for different ages of heart affections attending on a first attack of acute rheumatism.

Age on Admission.	Total.	Heart Affected.	Per Cent.
Under 10 years	2 .	1 .	50·0
over 10 under 15	4 .	4 .	100·0
over 15 „ 20	18 .	13 .	72·2
„ 20 „ 25	23 .	10 .	43·5
„ 25 „ 30	14 .	4 .	28·5
from 30 to 40	13 .	4 .	30·7
over 40 years	1 .	0 .	0·0

In the greater number of those suffering from subsequent attacks, the date of their first attack is preserved.

Age at First Attack.	Total.	Heart Affected.	Per Cent.
Under 10 years .	5 .	4 .	80·0
over 10 under 15	14 .	8 .	57·1
„ 15 „ 20	9 .	6 .	66·6
„ 20 „ 25	12 .	6 .	50·0
„ 25 „ 30	6 .	3 .	50·0
from 30 to 40 .	6 .	2 .	33·3
over 40 years	1 .	1 .	100·0?

It is not meant to be alleged that in all these instances the first attack was that in which the disease of the heart commenced; on the contrary it is to be remembered that not only are there among these cases, in which inflammation of the heart commenced along with their subsequent attack, but also cases must be included which were not due to rheumatic inflammation at all, and in which the diseases were merely coincident: the last case in particular was believed to be one of this sort, where the disease of the heart was believed to have been prior to his first rheumatic attack.

The age on admission of those contained in the last Table, gives the following proportions:

Age on Admission.	Total.	Heart Affected.	Per Cent.
Under 10 years	0	0	0·0
over 10 under 15	3	3	100·0
„ 15 „ 20	10	6	60·0
„ 20 „ 25	11	8	72·7
„ 25 „ 30	6	3	50·0
from 30 to 40	16	7	43·7
over 40 years	7	3	42·9

This Table, compared with one at page 16, containing the ages of all the acute cases on admission, shows the additional ratio of cardiac affection for each period, due to renewed attacks of rheumatism. The general fact which they all indicate is, that up to 25 years of age, there is a much greater liability to disease of the heart following on acute rheumatism. But this is less in cases of a repeated attack, not only relatively to more advanced ages, but absolutely in proportion to the number of cases.

### III. *Of a History of Acute Rheumatism.*

In addition to the record of previous attacks in acute cases, an attempt has been made in all the rheumatic cases <sup>1</sup> together, to ascertain how many had at any time suffered from acute rheumatism, and to note the condition of the

<sup>1</sup> In making this inquiry it was to be remembered how difficult it is to obtain correct information of this sort from Hospital patients, and it therefore seemed desirable to limit it to persons who, being at the time subjects of rheumatism, might the more readily answer whether they had ever been before similarly affected, while there would be in the condition of the patient himself at the time, a standard of comparison with which to contrast his own account of his previous state. It was necessary in this case to adopt the limitation of acute rheumatism already noted, and a useful adjunct was found in the question whether the person had been at any time unable to feed himself, and for how long. There seemed also to be an advantage in selecting a class of cases in so far similarly circumstanced, for statistical purposes, in preference to making the same inquiry of every patient for a limited time. The conclusions are open to the fallacy already noticed, that disease of the heart does sometimes occur, although very rarely in a subacute attack; but the question was always put before the heart was examined, and the result was that in only two instances, as already noticed, the heart was affected with a history of merely slight rheumatism. The ratio of diseases of the heart has, therefore, only been given for acute cases.

heart. In 450 instances this record has been kept, when it appeared that 200 had had previous attacks of some sort or other, while 250 had never suffered from it before to their knowledge. In 88, so far as could be made out, the attack was acute, and 32 had disease of the heart, only 2 being marked as doubtful. In almost all, the date of the first attack has been recorded.

## ADMITTED WITH SUB-ACUTE RHEUMATISM.

Age at first Attack.	Rheumatism not Acute.	Acute Rheumatism.	Heart Diseased.	Per Cent.
Under 10 years	0 .	3 .	3 .	100·0
over 10 under 20	6 .	16 .	8 .	50·0
„ 20 „ 30	9 .	18 .	7 .	38·9
„ 30 „ 40	6 .	7 .	0 .	0·0
over 40 years	7 .	2 .	0 .	0·0

## ADMITTED WITH CHRONIC RHEUMATISM.

Age at first Attack.	Rheumatism not Acute.	Acute Rheumatism.	Heart Diseased.	Per Cent.
Under 10 years	0 .	1 .	0 .	0·0
over 10 under 20	4 .	14 .	6 .	42·8
„ 20 „ 30	27 .	13 .	5 .	38·5
„ 30 „ 40	19 .	12 .	3 .	25·0
over 40 years	34 .	2 .	0 .	0·0

Much reliance cannot, I fear, be placed on these proportions, although every effort has been used to obtain accurate results. If they be worth anything at all, they give a very favorable view of the ultimate progress of cases of acute rheumatism, especially where there has been no recurrence of the disease in an acute form.

IV. *Confirmed Disease of the Heart.*

In addition to 82 cases of disease of old standing to be found in the Table of *post-mortem* appearances, there are records of 124 which left the hospital more or less relieved; 206 in all. Among these there is a distinct history of acute rheumatism in 69 instances; but in 4 instances, from *post-mortem* appearances, and in 3 from clinical examination, there was reason to doubt whether the lesion could have been the result of rheumatic inflammation. Such cases must be regarded as doubtful, as well as those having a history of

only slight rheumatism or gout, for though on reference to the Table it will appear that in the majority the two diseases are merely accidentally coincident, still to this there are exceptions; one has been already mentioned (page 14); another stated that he had suffered from gout at 18, which he alleged to be hereditary; but *post-mortem* evidence showed the disease to have had an inflammatory origin, whence the presumption is that the attack was of the nature of acute rheumatism rather than gout. To these doubtful cases must be also added all in which no record on this point has been kept, for in reference to such a question negative results are as important as positive ones; and it was my intention to record both, the omission having chiefly occurred in cases affording no evidence of anything beyond alteration in dimensions, which the mind does not naturally refer to rheumatism as one of its causes.

The whole number recorded as never having suffered from rheumatism at all was 73: and if from the rheumatic cases all questionable ones be excluded together, there will remain 62 rheumatic, and 71 doubtful.

In considering the influence of sex, it is necessary to bear in mind, that taking all medical cases together at St. George's Hospital, the proportion of admissions and deaths for each sex is nearly equal throughout the year. Thus, for example, the physicians' patients admitted during six months ending in March, 1851, were 347 males and 344 females, while the deaths during the same period were 41 males and 41 females. In confirmed disease of the heart, there is a very decided preponderance of the male sex, there being 119 males and 87 females. The per-centage of mortality is also higher, being about 45 for males and 36 for females. This is the more remarkable, as we have found females somewhat more liable than males to disease of the heart from acute rheumatism. The relation of sex to a rheumatic origin may be represented thus for the 206 cases under consideration:

<i>Males.</i>		
Of rheumatic origin	.	34 or 16·5 per cent.
non-rheumatic „	.	11 or 20·0 „
doubtful „	.	15 or 21·8 „

*Females.*

Of rheumatic origin . . .	28 or 13·6 per cent.
non-rheumatic „ . . .	32 or 15·5 „
doubtful „ . . .	26 or 12·6 „

Whence it appears, that although this preponderance does not exist to the same extent in cases decidedly rheumatic, still, even in those there is an excess of males admitted labouring under confirmed lesion.

The influence of age with reference to a rheumatic origin seems to be very considerable. The cases may be arranged, according to their ages at admission, in periods of ten years.

Age on Admission.	Of Rheumatic Origin.		Non-Rheumatic.		Doubtful.	
	Fatal.	Not Fatal.	Fatal.	Not Fatal.	Fatal.	Not Fatal.
Under 10 years . . .	0	2	0	1	0	1
over 10 under 20 . . .	4	17	0	1	1	2
„ 20 „ 30 . . .	4	10	5	8	1	7
„ 30 „ 40 . . .	4	7	5	13	7	7
„ 40 „ 50 . . .	4	5	13	6	13	7
„ 50 „ 60 . . .	2	1	7	5	10	5
over 60 years . . .	0	0	8	2	1	10

The striking fact here is, that up to the age of 20 almost the whole, and even as far as 30, considerably more than half the cases, are ascribed to a rheumatic origin; between 20 and 30 the non-rheumatic cases first appear; in the two succeeding periods they nearly double the rheumatic; and after 50 there are scarcely any rheumatic cases at all. The ratio of mortality sensibly increases in each period, beginning with one fifth of all the cases between 10 and 20, and reaching to two thirds between 50 and 60. I am quite unable to explain the anomaly of only 1 death among 11 cases in the last column, over 60 years of age.

In 59 of the cases supposed to be of rheumatic origin, the age at the period of the first attack has been recorded, and is here given for comparison with preceding Tables:

Age at first Attack.	Males.	Females.	Total.
Under 10 years . . .	3	5	8
over 10 under 15 . . .	11	5	16

Age at first attack.	Males.	Females.	Total.
over 15 under 20 . . .	4 .	8 .	12
from 20 to 30 . . .	13 .	1 .	14
„ 30 to 40 . . .	3 .	4 .	7
over 40 years . . .	1 .	1 .	2

Among the fatal cases of rheumatic origin, the period from the first attack of acute rheumatism to the fatal termination, may afford some evidence of the general duration of cardiac disease; but the instances are very much too few to form the ground of anything but the most general conclusions. Recent cases must be excluded, and also those doubtful ones of which the commencement in rheumatism was uncertain. As might be anticipated, the laborious occupations of the male sex among hospital patients materially shortens their duration; thus there are 2 deaths at 4 years after the first attack of acute rheumatism, 2 at 5, 2 at 6, 1 at 8, and 1 at 23, as well as 1 at 30 years after. It is unfortunately not recorded in either of these last instances whether there had been any subsequent attacks. Among females there are 2 deaths at 12 years, 1 at 13, 2 at 15, and 1 at 16 years after their first attack.

In conclusion I may be permitted to recapitulate the several results of this statistical inquiry. Of 8 cases fatal during the rheumatic attack, 6 had pericarditis, 3 endocarditis, and 2 no inflammation of the heart. One case of pericarditis gave no friction sound, and one case with no valvular lesion gave a distinct endocardial murmur.

Two other cases of pericarditis are traced to acute peritonitis, and one to recent pleurisy; a large proportion of the remainder were associated with albuminuria, but it has seemed in these instances that the tumultuous action of the heart during life had had very much to do with the traces of pericarditis found after death. In one instance there was no other cause known.

Two cases of recent lymph on the valves are traced to malformation, and two to disease of the kidney; almost all the remaining instances occurred among patients in whom old thickening was found, which was probably due to bygone attacks of rheumatism.

More than half the cases which had at one time suffered from acute rheumatism indicate old pericarditis. The pericardium was found six times universally firmly adherent, in only one of which there was a history of rheumatism; in three, the adhesions were nearly universal with histories of acute rheumatism; and about a third of the remainder with only slight or no adhesions were also rheumatic: hence it would appear that universal adhesion is not the common result of rheumatic pericarditis, nor does the condition of the heart in these cases appear to indicate that it is the most favorable termination.

About a third of the cases of valvular lesion are associated with a rheumatic history, and among them there is a great preponderance of cases of simultaneous lesion of both sets of valves, next of the mitral alone, and scarcely any in which the aortic valves alone are diseased; it seems in most of these cases probable that during the first attack of rheumatism the mitral valves were alone inflamed, and at some future period also the aortic secondarily. In more than half the cases of valvular lesion the kidney was not quite healthy.

Disease of the aortic valves is more frequently associated with hypertrophy, and of the mitral with dilatation; adhesions of the pericardium mostly with dilatation. Atheroma of the aorta and disease of the kidney, each accompany a large majority of the cases of simple hypertrophy. In nearly half of all cases of disease of kidney indiscriminately, there is alteration in the muscular structure of the heart.

In regard to acute rheumatism it is shown that in the greater number of instances it occurs before 25 years of age, and that the largest proportion of cardiac inflammations are found between 10 and 15 years of age. Females are in a slight degree more liable to it than males, and are also more subject to cardiac complications. On the other hand, there are many more males than females admitted with confirmed disease of the heart, but the difference is less when the disease is of rheumatic origin. At the earlier ages almost all cases of confirmed disease of the heart, owe their origin to acute rheumatism, at more advanced ages it almost ceases to be found among the causes.

No.	Lesions of Pericardium.	Alterations in		Condition of Valves.		Sex.	Age.
		Muscular Structure.	Cavities.	Aortic.	Mitral.		
1	Thick layer of recent lymph; some adhesions; membrane thickened.	—	—	Recent lymph.	Thickened and recent lymph.	M.	12
2	Recent lymph; firm adhesions; numerous shreds of lymph.	Hypertrophied.	Dilated.	Recent lymph.	Thickened and recent lymph.	F.	17
3	Recent pericarditis; much serum.	—	—	—	—	M.	21
4	Thin layer of recent lymph.	Fatty.	—	—	Recent lymph.	F.	30
5	Recent lymph and old white patch.	—	—	—	Slightly atheromatous.	F.	41
6	Very slight effusion of lymph.	—	—	—	—	M.	25
7	2 oz. of serum.	—	—	—	—	F.	23
8	— —	—	—	Opaque.	Opaque.	F.	45
9	Numerous shreds of lymph.	—	—	—	—	M.	16
10	Feebly adherent; recent lymph.	Hypertrophied.	Dilated.	—	—	F.	46
11	Thick layer of recent lymph	—	—	—	—	M.	42
12	Coated with effused lymph.	Hypertrophied.	—	—	—	F.	15
13	Few shreds of lymph.	Slightly atrophied.	Dilated.	—	Greatly thickened.	F.	38
14	Recent pericarditis.	Hypertrophied.	—	Atheromatous.	Atheromatous.	F.	33
15	Much recent shreddy lymph.	Slightly hypertrophied.	—	—	—	F.	40
16	Some shreds of lymph; large quantity of serum.	Hypertrophied.	—	—	—	F.	40
17	Small fringe of recent lymph.	—	—	—	Thickened and recent lymph.	F.	44
18	Few flakes of lymph.	Hypertrophied, flabby.	Greatly dilated.	Malformation; recent lymph.	Recent lymph.	M.	25
19	Few flakes of lymph.	Hypertrophied.	Greatly dilated.	Greatly thickened.	Opaque, slightly thick.	M.	35
20	Several patches of recent lymph, large old white spot.	—	Dilated.	Slightly thickened.	Thickened, contracted.	M.	32
21	Few shreds of lymph; two white patches.	Slightly hypertrophied.	Dilated.	Thickened, calcareous, recent lymph.	—	M.	40
22	Firm, thick, false membrane; patches of shreddy lymph.	—	Dilated.	Opaque.	Thickened.	M.	45
23	Layer of recent lymph; grey patch on heart.	Hypertrophied.	—	—	—	F.	43
24	Partial adhesions; not quite recent lymph.	Greatly hypertrophied.	Dilated.	—	Recent lymph.	M.	50

History of Acute Rheumatism.	State of Kidneys.	Other important Lesions.	Clinical Observations.
On admission and 6 years ago.	—	Tricuspid thickened; recent pleuritis and pneumonia.	Acute rheumatism of 15 days' duration; murmur at base and apex, and friction sound.
On admission and previously.	—	Recent pleuritis; capsule of liver thick.	Third attack of acute rheumatism; friction sound, and an indistinct systolic murmur.
On admission.	—	— —	Acute rheumatism of 7 days' duration; collapse on admission.
On admission.	Slightly granular.	Atheroma of aorta.	Acute rheumatism of 12 days' duration; friction sound.
On admission.	—	Enlarged Peyer's glands; congested lungs; atheroma of aorta.	First attack of acute rheumatism, fatal in 22 days; no friction sound ever heard, rhythm altered. (Continued fever?)
On admission.	—	Suppuration in and round joints; congestion of brain.	Acute rheumatism (?) of 13 days' duration; suppuration, delirium.
On admission.	—	Small quantity of turbid serum in peritoneum.	Acute rheumatism; delirium; systolic murmur above base of heart.
On admission.	—	Pus in synovial cavities of both wrists.	Moribund; treated before admission for rheumatic fever; collections of matter at wrists.
Never (?)	—	Recent peritonitis and pleuritis.	Peritonitis from injury (?), rapidly fatal.
Never.	Granular.	Recent peritonitis and pleuritis; cirrhosis of liver.	Dropsy, especially ascites; heart's action extended; dyspnoea; albuminuria: peritonitis, &c., occurring after paracentesis abdominis.
—	—	Extensive recent pleuritis and pneumonia.	Pleuro-pneumonia; heart's sounds distant and obscure.
Eight months ago (?)	Right, mottled; left, dwindled.	Recent pleuritis; serous effusion in brain.	Albuminuria; facial hemiplegia; pericardial friction.
First attack, 26 years ago.	Puckered, cysted.	Recent lymph on tricuspid, and thickening; old pleuritis; capsule of liver thickened.	Dropsy; systolic murmur at apex of heart; very little albumen in urine.
Never.	Granular	Atheroma of aorta; slight recent pleuritis; nutmeg liver.	Dropsy; dyspnoea; heart's action increased, systolic murmur at apex; urine very albuminous; diffuse cellular inflammation.
—	Contracted, granular.	Liver enlarged, nutmeg; atheroma of aorta.	Albuminuria and enlarged liver; pericarditis supervening before death.
Never.	Cysted, congested.	Lateral curvature of spine; large nutmeg liver.	Dropsy; loud systolic murmur; albuminuria.
Never.	Dilated, cysted.	Scirrhus of uterus and vagina pressing on ureters.	Anasarca, albuminuria, cancer of uterus, &c.; heart's sounds obscure, apparently a double murmur.
Never.	—	Tricuspid and pulmonic valves atrophied; lymph on endocardium; nutmeg liver.	Dropsy; dyspnoea; heart's action tumultuous; no bruit made out; hæmoptysis.
Occasional slight, never acute.	—	Lungs congested, rather emphysematous, commencing peritonitis.	Cough and palpitation, never previously; heart's action increased; double murmur at base; latterly dropsy.
First attack, 6 years ago.	—	Tricuspid thickened.	Dropsy; heart's action increased; loud systolic murmur at apex; slight murmur at base (?); urine transiently albuminous.
First attack, 5 years ago.	—	Tricuspid slightly thickened; old pleuritis.	Chronic rheumatism; double murmur at base of heart; anasarca; dyspnoea.
Six months ago.	Cysted.	Aneurism of aorta.	Dropsy; heart's action irregular; no albumen in urine.
—	Granular, cysted.	Atheroma of aorta.	Hæmoptysis; œdema of ankles; heart's action increased, sounds indistinct; albuminuria; friction before death.
First attack, 6 years ago.	Dwindled, adherent capsules.	— —	"Severe cold" four months before; dropsy; dyspnoea; heart's sounds muffled and obscure; albuminuria.

No.	Lesions of Pericardium.	Alterations in		Condition of Valves.		Sex.	Age.
		Muscular Structure.	Cavities.	Aortic.	Mitral.		
25	Universally, not firmly adherent.	Slightly hypertrophied.	Slightly dilated.	Thickened.	Thickened, calcareous.	M.	54
26	Universally adherent, rather recent lymph.	Slightly hypertrophied.	Dilated.	—	—	M.	58
27	Chronic thickening, and rather recent lymph.	Partially atrophied.	Greatly dilated.	—	Opaque.	F.	35
28	— —	Hypertrophied.	—	One flap large, recent lymph.	—	M.	25
29	Chronic thickening of membrane.	Hypertrophied.	Dilated.	One spot of recent lymph.	—	M.	45
30	Considerable old adhesions.	Hypertrophied.	Dilated.	—	Contracted and recent lymph.	F.	16
31	Almost universal firm adhesions.	Greatly hypertrophied.	Dilated.	Recent lymph.	Thickened and recent lymph.	M.	20
32	— —	Hypertrophied.	Dilated.	Thickened, calcareous, recent lymph.	Greatly thickened, calcareous lymph.	F.	37
33	General old adhesion.	Attenuated.	Dilated.	Thickened.	Thickened and recent lymph.	F.	38
34	Large patch of old lymph.	Greatly hypertrophied.	Dilated.	Thickened and recent lymph.	Greatly thickened.	M.	42
35	Universally firmly adherent.	—	—	—	Not quite recent lymph.	M.	17
36	— —	—	—	—	Not quite recent lymph.	F.	42
37	Universal old adhesion; adherent pericardium.	Greatly hypertrophied.	Dilated.	Thickened calcareous deposit.	—	M.	33
38	Universal old adhesions.	Hypertrophied.	—	—	Slightly roughened.	F.	40
39	Universally firmly adherent.	—	—	—	—	M.	43
40	Universal old adhesions.	Pale, atrophied.	Dilated.	—	Thickened, atheromatous.	M.	46
41	Universal old adhesion.	Greatly hypertrophied.	Greatly dilated.	—	—	M.	55
42	Membrane thickened; large old patch of lymph.	Slightly hypertrophied.	Greatly dilated.	Thickened.	Thickened, calcareous deposit.	M.	22
43	Considerable old adhesions and large white spot.	Slightly hypertrophied.	Greatly dilated.	—	Thickened.	F.	27
44	Considerable firm adhesions.	Greatly hypertrophied.	Greatly dilated.	Slightly thickened.	Slightly thickened.	M.	26
45	Several white patches.	—	—	Thickened, atrophied.	—	M.	45
46	Whitish membranous layer.	Slightly hypertrophied.	Dilated.	—	—	F.	46
47	Partial old adhesions.	—	An unusual dilatation.	—	—	M.	50
48	Several white patches.	Attenuated.	Dilated.	—	—	M.	51

History of Acute Rheumatism.	State of Kidneys.	Other important Lesions.	Clinical Observations.
First attack, 30 years ago.	Granular.	Slight old pleuritis; extensive old peritonitis.	Ascites and anasarca; albuminuria; heart's action irregular; obscure systolic murmur.
25 years ago.	—	Atheroma of aorta; tubercles and consolidation of lungs; liver rounded, nutmeg.	"Severe cold" six months ago; palpitation four months; heart's action irregular; phthisis; anasarca; no illness for 25 years past.
Never.	—	Tricuspid opaque; peritonitis old and tolerably recent.	Dropsy; heart's action extended; urine transiently albuminous; local peritonitis two months before death.
Never.	Large, smooth, mottled.	Old peritonitis; atheroma of aorta.	Double murmur at base of heart, with increased action; general dropsy; no illness for 20 years.
Never.	Granular, cysted.	Old pleuritis and peritonitis; nutmeg liver.	Dropsy; heart's action increased; albuminuria.
First attack, 13 years ago.	—	Lymph on endocardium; atheroma of aorta; congestion of lungs.	Cough and palpitation; dropsy after admission; heart's action increased; loud systolic murmur at apex.
First attack, 4 years ago.	Large, congested.	Old pleuritis.	Dropsy; moribund on admission; heart's action tumultuous; murmur at apex; albuminous urine.
First attack, 22 years ago.	Extravasated blood.	Old and recent pleuritis.	Dropsy; heart's action increased, systolic murmur at base and apex; urine very albuminous; hæmoptysis.
First attack, 21 years ago.	—	Old pleuritis; inflamed bronchi; old peritonitis; nutmeg liver.	Three times in hospital with anasarca and ascites; double murmur at base of heart.
First attack, 23 years ago.	—	—	Twice previously in hospital with cardiac pain and spasm; slight anasarca; heart's action increased, murmur at apex and base (?).
Five years ago & just before admission(?).	—	Inflammation of spinal chord.	Chorea; heart's sounds excited and indistinct; systolic murmur at apex.
Six months ago.	—	Tolerably recent lymph on lining membrane of left auricle.	Dyspnoea; heart's action excited and irregular; systolic murmur at apex.
—	Right atrophied.	Congenital malformation of aorta; old pleuritis; nutmeg liver.	Pain in region of liver; dyspnoea; double murmur at base of heart; hæmoptysis.
Never.	—	Old and recent peritonitis; old pleurisy on right side.	Ascites with anasarca; paracentesis twice in four months; peritonitis followed on second operation.
Never (?).	Small.	Cirrhosis of liver.	Ascites with anasarca; no albuminuria, no cardiac symptoms; no previous illness.
Never.	Coarse, granular.	Old and recent pleuritis; nutmeg liver.	Dropsy; heart's action feeble, murmur at apex; no albumen observed in urine.
Never.	Somewhat dwindled.	—	General dropsy, dyspnoea, hæmoptysis; heart's sounds muffled, irregular; urine transiently free from albumen.
Eight years ago.	—	Emphysema of lungs; pleuritis not quite recent.	Excessive dyspnoea; pulse 240 (?); heart's action very greatly excited; sounds imperfect.
15 years ago.	—	Nutmeg liver.	Dropsy; heart's action irregular; murmur at apex.
Never.	—	Old pleuritis on left side.	Dropsy; heart's action increased, systolic murmur at apex.
Never.	Right, puckered, congested	Atheroma of aorta.	Dropsy, hæmoptysis; double murmur at base of heart; urine transiently albuminous.
—	—	Old pleuritis and peritonitis; nutmeg liver.	Dropsy; heart's action irregular, feeble.
Never (?).	—	Lining membrane of aorta thickened.	Dropsy; double murmur over centre and base of heart.
—	—	Emphysema and bronchitis; slight old pleuritis; vomica, and few crude tubercles.	Excessive dyspnoea; anasarca; heart's sounds loud; peritonitis, &c.

No.	Lesions of Pericardium.	Alterations in		Condition of Valves.		Sex.	Age.
		Muscular Structure.	Cavities.	Aortic.	Mitral.		
49	Firm band of old adhesion.	Slightly hypertrophied.	Dilated.	Ulcerated.	—	M.	55
50	Large patch of old lymph.	Greatly hypertrophied.	Greatly dilated.	Thickened.	Slightly thickened.	M.	56
51	Two white patches; slight adhesions.	Hypertrophied.	Dilated.	Thickened, atheromatous.	Thickened, atheromatous.	M.	73
52	— —	Hypertrophied.	Dilated.	—	Thickened, contracted.	M.	24
53	— —	Slightly atrophied.	Dilated.	—	Slightly thickened.	F.	42
54	— —	Slightly hypertrophied.	Greatly dilated.	Slightly thickened.	Thickened.	F.	51
55	— —	Fatty, hypertrophied.	Dilated.	Opaque.	Opaque.	F.	44
56	— —	Greatly hypertrophied.	—	—	Thickened, contracted, and atheromatous.	M.	32
57	— —	Greatly hypertrophied.	—	Deposit of lithate of soda.	—	M.	40
58	— —	Hypertrophied.	Dilated.	Slightly atheromatous.	Slightly atheromatous.	M.	54
59	— —	Hypertrophied.	Greatly dilated.	Slightly thickened.	Atheromatous.	M.	22
60	— —	Hypertrophied.	—	Atheromatous.	—	M.	45
61	Small patch of old lymph.	Pale.	—	Atheromatous.	Atheromatous.	M.	46
62	— —	Slightly hypertrophied.	Dilated.	Slightly atheromatous.	Slightly atheromatous.	F.	49
63	— —	Greatly hypertrophied.	Slightly dilated.	Slightly atheromatous.	—	M.	54
64	— —	Slightly hypertrophied.	—	Calcareous.	Calcareous.	M.	57
65	— —	Greatly hypertrophied.	Dilated.	Atheromatous.	Atheromatous.	F.	58
66	— —	Slightly hypertrophied, fatty.	Dilated.	—	Thickened, calcareous.	F.	64
67	White patch.	Greatly hypertrophied.	—	Slightly atheromatous.	Slightly atheromatous.	M.	66
68	Small white patch.	Hypertrophied.	Dilated.	—	Thickened, atheromatous.	F.	68
69	Two small white patches on heart.	Greatly hypertrophied.	Dilated.	—	—	M.	52
70	— —	Hypertrophied.	Dilated.	—	Slightly thickened.	F.	35
71	— —	—	Greatly dilated.	Slightly thickened.	Slightly thickened.	M.	36

History of Acute Rheumatism.	State of Kidneys.	Other important Lesions.	Clinical Observations.
Never.	Dwindled, capsules adherent.	Tricuspid thickened; atheroma of aorta; recent pleuritis; nutmeg liver.	Dropsy; dyspnoea; albuminuria; heart's action irregular; murmur with second sound at base.
—	Granular, cysted.	Atheroma of aorta.	Dropsy; hæmoptysis; albuminuria; heart's action increased; double murmur at base.
Never.	Cysted, adherent capsules.	Atheroma and ulceration of aorta; old pleuritis and peritonitis.	Dropsy; urine very albuminous; heart's action feeble, tumultuous; obscure systolic murmur.
Four years ago.	—	Recent pleuritis, from pulmonary apoplexy (?)	Slight dropsy; great dyspnoea; heart's action much increased; musical murmur at apex.
Many years ago.	Large, granular.	Tricuspid thickened; atheroma of aorta; extensive old pleuritis.	Dropsy; heart's action irregular; murmur at apex; no albumen in urine.
First attack, 15 years ago.	Granular, cysted.	Old pleuritis; capsule of liver thickened.	General dropsy; albuminuria; heart's action irregular; systolic murmur most distinct at apex.
Slight rheumatism, 7 months ago.	Large, coarse.	Pneumonia.	Dropsy; heart's action irregular; albuminuria.
Gout (?), 14 years.	—	—	Heart's sounds loud and shrill; urine albuminous; dropsy; sphacelus after acupuncture.
Hereditary gout, 20 yrs.	Granular.	Recent pleuritis; pneumonia; liver large, rounded; various deposits of lithate of soda.	Epistaxis; albuminuria; pleuro-pneumonia.
Slight rheumatism, 31 years ago.	Granular, cysted.	Atheroma of aorta; old pleuritis; capsule of liver thickened.	General dropsy; albuminuria; heart's sounds obscure; no bruit.
Never.	Congested.	Atheroma of tricuspid; old and recent pleuritis.	Dropsy; dyspnoea; heart's action tumultuous, murmur at apex; urine highly albuminous.
Never.	—	Aorta dilated, roughened with atheromatous and calcareous deposit.	Dropsy; double aortic murmur.
Never.	—	Atheroma of tricuspid, of endocardium, and aorta; liver large, fatty.	Jaundice; ascites; delirium; very dissipated habits; no cardiac bruit.
Never.	—	Old and recent pleuritis; liver congested, capsule thickened.	Dropsy; heart's action feeble; died suddenly.
—	Granular, mottled.	Atheroma of aorta.	Dropsy; hæmoptysis; albuminuria; heart's action increased; double murmur at base.
—	—	Calcareous deposit in aorta; bronchitis; liver contracted, granular.	Dropsy and bronchitis; dyspnoea; heart's action quiet; no bruit.
Never.	—	Atheroma of aorta; old pleuritis.	Dropsy; hæmoptysis; heart's action increased; double murmur at base, systolic at apex.
Never.	Large, mottled.	Organs all loaded with fat; liver contracted, granular.	Anasarca; lividity of skin; no albumen in urine; heart's action very feeble; murmur at apex.
—	Granular, cysted.	Atheromatous deposit in coronary arteries; emphysema of lungs; thickened capsule of liver.	Dropsy; albuminuria; heart's action irregular; indistinct systolic murmur.
Never.	Rough, adherent capsules.	Old pleuritis.	Dropsy; hæmoptysis; no albumen in urine; heart's action excited; no bruit.
Slight rheumatism many years ago.	Granular.	Atheroma of aorta; old pleuritis.	Slight chronic rheumatism; constant vomiting; albuminuria.
—	Granular.	Old and rather recent pleuritis; liver large, congested.	Anasarca; albuminuria; heart's action tumultuous; murmur at apex.
Never.	Coarse, lobulated.	Nutmeg liver.	Dropsy; hæmoptysis; heart's action turbulent; no albumen in urine; of intemperate habits.

No.	Lesions of Pericardium.	Alterations in		Condition of Valves.		Sex.	Age.
				Aortic.	Mitral.		
72	—	—	Slightly hypertrophied.	Greatly dilated.	Thickened.	M.	53
73	—	—	Fatty degeneration.	Dilated.	Opaque.	F.	60
74	—	—	Right especially hypertrophied.	Right side dilated.	Thickened.	M.	65
75	Small white patch.	—	Slightly hypertrophied.	—	Slightly thickened.	F.	75
76	Small white patch.	—	Hypertrophied.	Greatly dilated.	Slightly thickened.	M.	35
77	—	—	—	Greatly dilated.	Much thickened, contracted.	M.	43
78	—	—	—	—	—	M.	31
79	—	—	Slightly hypertrophied.	Slightly dilated.	Atrophied, perforated. Much thickened; atheromatous.	F.	40
80	—	—	Hypertrophied.	Greatly dilated.	—	M.	34
81	—	—	Hypertrophied.	—	—	M.	45
82	—	—	—	Dilated.	—	F.	46
83	—	—	Hypertrophied.	—	—	M.	51
84	—	—	Right side hypertrophied.	Right side dilated.	—	M.	24
85	—	—	Hypertrophied.	Dilated.	—	M.	29
86	—	—	Slightly hypertrophied.	Greatly dilated.	—	M.	39
87	—	—	Hypertrophied.	Dilated.	—	F.	40
88	—	—	Hypertrophied.	Dilated.	—	M.	44
89	—	—	Greatly hypertrophied.	—	—	M.	45
90	—	—	Hypertrophied.	Dilated.	—	F.	47
91	—	—	—	Dilated.	—	M.	71
92	—	—	Slightly hypertrophied.	Greatly dilated.	—	F.	54

History of Acute Rheumatism.	State of Kidneys.	Other important Lesions.	Clinical Observations.
Never.	—	Tricuspid thickened; atheroma of aorta.	Dropsy; heart's action irregular; murmur at apex.
Never (?)	Granular, cysted.	— —	Anasarca; heart's action feeble; sounds indistinct; albuminuria.
Never.	Coarse, mottled, cysted.	Calcareous deposit in aorta; emphysema of lungs; capsule of liver puckered.	Dropsy; dyspnoea; heart's sounds prolonged; urine transiently free from albumen.
Never.	Cysted.	Atheroma of aorta; old pleuritis; capsule of liver thickened.	Dropsy; heart's action very irregular; urine transiently albuminous.
Never.	Granular, cysted.	Old and recent pleuritis.	Dropsy; pleuro-pneumonia; heart's action tumultuous; murmur at apex; urine not albuminous (only one examination).
Never.	Capsules adherent.	Aneurism from atheroma and calcareous deposit in aorta.	Dyspnoea; double murmur over aortic valves.
—	—	Recent pleuritis; emphysema.	Plenrisy and bronchitis; no cardiac murmur.
—	Small, pale, mottled.	Atheroma of aorta.	Slight jaundice, followed by dropsy; urine for some time free from albumen; heart's action tumultuous; no bruit heard; latterly albuminuria.
Only slight rheumatism.	Granular, cysted.	Old pleuritis; contracted nutmeg liver.	Dropsy; heart's action increased; murmur at apex; urine transiently albuminous.
Gout, 19 yrs.	Atrophied, granular.	— —	Dropsy; albuminuria.
Slight rheumatism, 17 years ago.	Mottled, cysted.	Old pleuritis; emphysema of lungs.	Dropsy; albuminuria; heart's action excited.
Gout, 20 yrs.	Granular, cysted.	Old pleuritis; miliary tubercle.	Dropsy; dyspnoea; epistaxis; albuminuria.
Never.	—	Great emphysema and bronchitis; old pleuritis; liver large.	Great dyspnoea; slight anasarca; heart's action turbulent, feeble.
—	—	Extensive old peritonitis; liver, much enlarged, nutmeg; pneumonia.	Ascites; heart's sounds obscure.
—	—	Pleuritis not quite recent.	Pleuro-pneumonia six months before death; dropsy; increased impulse of heart.
—	Mottled.	Liver nutmeg, with rounded edges.	Dropsy; heart's action increased; albuminuria.
—	Congested, adherent capsules.	Pleuritis, old and recent; liver friable.	Dropsy; great dyspnoea; heart's action irregular; urine slightly albuminous.
—	Granular, atrophied.	Atheroma of aorta; slight old pleuritis; apoplectic clot in ventricle of brain.	Dropsy two years ago; albuminuria; heart's action apparently very little increased; apoplexy occurring in hospital.
Never.	Granular, cysted.	Calcareous deposit in aorta; nutmeg liver.	Dropsy; albuminuria; heart's sounds shrill.
Never.	Right, large; left, dwindled.	Endocardial membrane thickened; old pleuritis.	Anasarca; albuminuria; palpitation; heart's sounds indistinct.
Never.	Congested, granular.	Bronchitis and emphysema of lungs.	Cough and palpitation three years; anasarca; albuminuria; heart's action tumultuous; systolic murmur at apex.



CASE IN WHICH A COMMUNICATION  
APPEARS TO HAVE EXISTED  
FOR SEVERAL MONTHS  
BETWEEN THE STOMACH AND TRANSVERSE COLON  
IN  
A CHILD FIVE YEARS OLD.

BY  
ROBERT JONES, Esq., CAERNARVON.

COMMUNICATED BY  
DR. WATSON.

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Received Nov. 8th.—Read Nov. 11th, 1851.

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Martin W—, aged 5 years, one of a healthy family of eight children, residing in an open healthy place, was observed on the 10th of December to be not quite well. On the 13th an oval eruption appeared on the forearm along the ulna, of an oblong shape, slightly elevated, not very tender to the touch. On that and the two following days, several spots, of the same kind, appeared on the arms and legs; they ran the usual course of erythema nodosum, disappeared, like bruises, about the eighth day, and left the child languid and feeble, and without any appetite. The bowels having been at first freely moved by a dose of senna tea, and afterwards by three grains of calomel, he had on the 16th of December several small doses of quina, gr.  $\frac{1}{4}$ , with Dover's powder, gr. j. As he continued ill after the disappearance of the eruption, another medical man was consulted, on the 19th. He was then very languid and weak, somewhat feverish and anxious, having passed a restless night. He had taken some senna tea in the morning, which produced a large solid evacuation in the evening. He was ordered a mixture of castor oil and turpentine, one drachm of each

to a 4 oz. mixture, of which he was to take half an ounce every two hours, and under this the child seemed to improve for two or three days, but still continued languid, and took little or no food, and lost flesh. About the 24th another crop of eruption appeared, and took the same course as the first, leaving the child still weaker; there was also a spot, on the perineum, like purpura, and considerable œdema of the prepuce. On the 30th he had a dose of senna tea in the morning, and repeated at noon; this acted twice early in the evening, and four times in the night with considerable pain. Early in the morning of the 31st, he was attacked with violent pain in the belly, and vomiting. The pain and vomiting continued to come on at frequent intervals, and the child appeared in the greatest distress; and on the 3d of January he vomited a small quantity of very fetid liquid, having a smell like that of pus from an old indolent abscess, and a brown colour, like tea with very little milk in it; he also discharged by stool some of the same fluid tinged with blood. He continued to vomit this offensive fluid until the 5th, when it ceased, having become gradually less in quantity and less fetid. On the 5th he was able to take and retain some medicine, consisting of Castor Oil, Liq. Potassæ, and Tr. Opii, which acted upon the bowels on the following day, the motion being black and hard. The medicine was continued for the two or three following days, and the child improved in every respect, and was considered convalescent. The pain however continued to recur at frequent intervals, and the bowels were constipated. The castor oil mixture was given every morning, and tonics during the day, with no other relief than action of the bowels. The pain came at intervals, and appeared to be caused by flatulence, there being after and during each pain a loud rumbling noise, so loud as to be heard over a large room, and exactly like that caused by pouring liquid out of a narrow necked bottle; the child required the constant pressure of the nurse's hand. The medicine was given every day, sometimes varied with rhubarb and magnesia, until about the 1st of February; the symptoms during all this time having continued about

the same. The child was quite free from fever, and happy during the intervals of ease, which, however, were not of more than about twenty minutes' duration, day or night. The medicine only produced one motion daily, and that rather constipated than otherwise; and as it brought no relief from pain it was left off entirely, and no medicine whatever was given. In about three days the bowels acted, the feces being hard and scybalous: for some days after this enemata of arrowroot and castor oil were injected, and the bowels soon began to act naturally, the stools being of good colour and consistence. On the 20th of February he was still suffering from frequent pains attended with the same rumbling noise; he was extremely emaciated and weak; the appetite was pretty good; and he enjoyed some animal food, and had two or three wine-glassfuls of table beer in the course of the day; the skin was cool, urine abundant and clear, and countenance placid, when he was free from pain; he slept six or eight hours out of the twenty-four, but was frequently disturbed by the pain, which did not appear to be increased or diminished by any kind of food. The abdomen was a good deal distended and resonant on percussion; it was often seen bulging out over the arch of the colon. Although the child took a sufficient quantity of food he gained no flesh, and was emaciated to the last degree; he lay continually on the sofa or bed, but could raise himself to the sitting posture without pain. On this day, 20th February, he vomited about a pint of thick fluid of a yellowish colour with an acid smell, it appeared to be food converted into chyme; the same thing had happened about every second day for some time before. After having vomited he was quite relieved, and much better for about forty-eight hours, until the sickness came on again. He went on in this way until the 10th of March, when diarrhoea came on, and he was relieved entirely from all pain and sickness; the bowels were moved as often as fifteen times during the day for the first five days, and for a considerable period six times daily, and the child improved rapidly; the appetite was almost voracious, and he slept comfortably at night: the child, however, did not gain flesh

and strength in proportion to the improvement in other respects, and the belly was still considerably enlarged. He, however, did improve gradually for about two months, and at the end of that period, viz., about the middle of May, his appetite began to fail, the bowels became torpid, and the child languid. About the beginning of June the bowels, not having been moved for two days, I gave him a draught of rhubarb and magnesia, which caused vomiting and a good deal of pain. The pain soon ceased, but the vomiting continued. The draught did not operate upon the bowels; and I observed that the matter he vomited was stercoraceous, of a light yellow colour, and semi-liquid. I felt no doubt at this time but that the vomiting had been stercoraceous in February, though the smell was not at that time so decidedly faecal as at this time. During the whole of June and July, the child continued much in the same state; he was free from pain; vomited about every second day; sometimes had an evacuation of the bowels, and in that case did not vomit; but if the bowels were not moved we were sure that he would vomit, and he did so, about every second day; before vomiting he was distressed and languid, but afterwards quite cheerful, and would call for food, which he seldom or never threw up. Aperient medicines invariably caused vomiting, and never acted upon the bowels. At the end of July the child appeared much worse in every respect; the abdomen was much distended, and the vomiting more frequent, while the bowels were moved more seldom, but he had no pain, and I should mention that he had none of the rumbling noise since the attack of diarrhoea in March. About the 27th of July I was induced to give him  $\text{ʒss}$  of castor oil, and the dose was repeated on the following day; it did not operate upon the bowels, but great pain and vomiting came on, and total loss of appetite; the child took no food from that time, and on the 2d of August died exhausted.

The body was examined on the 3d of August, seventeen hours after death, by myself and my assistants.

The body was extremely emaciated, the abdomen discoloured, of a greenish hue, resonant on percussion, excepting

at the hypogastric region; it measured at the scrob. cordis 25 inches, and at the umbilicus  $23\frac{1}{2}$ .

On opening the abdomen, some turbid serum escaped. The colon seemed to occupy the whole cavity, and formed several coils; its peritoneum injected, and in red patches, and mottled with dark ashy spots, and in some parts covered with a thin layer of lymph; there was a small round opening as large as a pin's head at the fore part of the transverse arch. The colon was at least twice its natural size in diameter. The omentum was gorged with blood, and very dark. The stomach contained a small quantity of dark thick liquid, and seemed small. There was an adhesion between the transverse portion of the colon and the stomach, and an opening between them through which I could pass my finger easily from the stomach into the colon.

The small intestines were contracted very short, not being more than three feet in length, and empty.

The colon was filled with thick yellow liquid, like what the child vomited during life, and from which it could not be distinguished; there were also some small hard lumps of fæces. The rectum was empty, the mucous membrane appeared everywhere healthy.

The liver was of its usual size, of a yellowish white colour when cut into, and rather hard, except at the left lobe, which was healthy; on the right it adhered to the side of the abdomen.

The gall bladder was full of bile.

The spleen was small and very hard.

The kidneys were healthy.

The bladder contained about a teacupful of urine.

The pleuræ contained about an ounce of serum on each side, and there were considerable adhesions on the left.

The lungs and heart were healthy.



ON  
ALKALESCENCE OF THE URINE  
FROM  
FIXED ALKALI  
IN SOME CASES OF  
DISEASE OF THE STOMACH.

BY  
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Received Nov. 11th.—Read Dec. 9th, 1851.

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IN the 'Philosophical Transactions' for 1845, I stated that the urine was occasionally alkaline from fixed alkali, and I contrasted this state with the alkalescence of the urine from volatile alkali.

Afterwards, when I was examining more closely the variations of the acidity of the urine in health, I found that this state of alkalescence from fixed alkali was not unfrequently observable during the time when digestion was taking place. (Phil. Trans., 1849.) Hence I concluded that alkalescence of the urine from fixed alkali was not caused by any disease of the urinary organs, but depended only on some slight disorder of the stomach. I have since frequently examined the urine of patients suffering from slight indigestion, and who were passing oxalate of lime; and not unfrequently in such cases the urine has made red test-paper permanently blue when dry; but with one or two exceptions this reaction was very transitory, though frequently recurring. One patient in whom this kind of alkalescence was daily known to be present, was a medical man, whose occupation prevented me from tracing the variations of the urine, and

from watching the state of the digestion as I wished. Very lately in two most marked cases of disease in which *sarcinae ventriculi* were found in the vomited matter, this alkalescence of the urine from fixed alkali has occurred to me in St. George's Hospital; and as they confirm the view which I have taken regarding the influence of the stomach in causing this state of urine, they may be worthy of the attention of the Medical and Chirurgical Society.

David M—, æt. 46, a stout, well made, ruddy faced Welsh farmer, was admitted, October 1st, 1851, into St. George's Hospital.

He says that fifteen years ago after a cold, he first had slight pain in the stomach, which usually came on about 11 o'clock in the forenoon; medical treatment relieved him in about a fortnight. Three months afterwards, in the autumn, the pain returned. Still without any vomiting. For many years he was subject to the same kind of attacks every two or three months. About five years since he first suffered from vomiting as well as pain; still with intervals in which he was tolerably well. For the last eighteen months, however, he has had constant pain in the abdomen, with a sensation of heat and pain along the œsophagus, with almost daily vomiting.

His bowels are always costive, and when they are open he is always better.

He says that the longest interval of freedom from the sickness was seven weeks, and that was whilst drinking some waters in Wales, during which time his bowels acted regularly. Tongue white, furred. Pulse quiet, 56. Complains of frequently feeling cold. In other respects he is quite well, able to take good exercise, and is not at all emaciated.

October 1st. Broth diet.

3d. The bowels were open. The total quantity of urine passed was acid to test-paper. He had much sickness in the night, accompanied with much flatulence. The vomited matter was not frothy, but of a dirty colour, of a yeasty odour, and highly acid. *Torulae* and *sarcinae* were easily found on examination by the microscope. He complained

of thirst. Bismuthi Trisnit., gr. x, t. d. The broth diet was changed for roast slice and beef-tea.

4th. Vomited at 11 p.m. last night, and suffered much from flatus in the night. The fluid thrown off the stomach was about three pints, more yeasty in appearance, contained more sarcinæ, and was intensely acid.

The urine was passed into separate vessels each time of making water. The vessels were marked 1, 2, 3, 4, 5.

1. Passed early in the evening before vomiting. Acid contained a plentiful deposit of the urates.

2. Passed later in the evening before he vomited, was lighter in colour, and without any sediment. It was also acid.

3. Passed at 11 p.m. directly after vomiting, was cloudy from deposit of phosphate of lime, and triple phosphate in small quantity. The surface was iridescent. Blue test-paper remained blue on drying. Red paper was turned blue, and remained blue when dry.

4. Passed at 1 a.m. rather less alkaline, iridescent, cloudy from phosphates.

5. Passed before breakfast; much less alkaline, clear, and without sediment.

The usual hours of taking food were — breakfast at 7 a.m.; dinner at noon; tea at 4 p.m.; gruel at 7 p.m. Bread was often eaten at other hours during the night and day.

5th. Bowels not open. Vomited at 7 a.m. with the usual pain, which is relieved by the sickness.

Urine passed at 8 p.m. last night, acid to test-paper.

„ 12 midnight, acid.

„ 3½ a.m. acid.

„ 7 a.m. alkaline.

„ 10½ a.m. alkaline.

6th. Tongue white and coated. Bowels well open. No vomiting, and very little pain.

Urine passed at 9 p.m. neutral to test-paper.

„ 2 a.m. alkaline.

„ 6 a.m. very alkaline.

Urine passed at 8 a.m. very alkaline.

„ 10 a.m. acid.

„ 12 more acid.

7th. Vomited at midnight about four pints of intensely acid, yeasty matter; was very much troubled with flatus during the afternoon of yesterday.

Urine passed at 8 p.m. acid.

„ 12 p.m. alkaline.

„ 7 a.m. alkaline.

„ 9 a.m. alkaline.

„ 10·15 a.m. alkaline.

„ 2·15 p.m. slightly acid.

8th. Vomited twice; once at midnight and again at 5½ a.m. Had more pain and flatulence last night. Bowels not open since the 5th.

Urine passed at 9 p.m. acid.

„ 12 p.m. acid.

„ 5 a.m. alkaline.

„ 7 a.m. alkaline.

„ 9 a.m. alkaline.

„ 1 p.m. alkaline.

Sodæ Sulphitis, gr. xx; Aquæ, ʒiiss, bis die sumend.

Repetatur enema commune. Milk, one pint.

9th. Vomited about half an hour after midnight. Had much pain and flatulence. Bowels open.

Urine passed at 8 p.m. acid.

„ 12½ acid.

„ 7 a.m. alkaline.

„ 9 a.m. alkaline.

„ 11½ a.m. alkaline.

10th. Has had no sickness or pain. Says that after taking the mixture he has great eructation. Feels much better.

Urine passed at 9½ p.m. acid.

„ 5 a.m. acid.

„ 6 a.m. alkaline.

„ 8½ a.m. alkaline.

„ 11¼ a.m. acid.

11th. Had no return of the sickness, but a good deal of pain at the pit of the stomach. Bowels not open since the 8th. Tongue cleaner than on admission.

Urine passed at 4½ p.m. slightly alkaline.

„ 8½ p.m. acid.

„ 1½ a.m. acid.

„ 3½ a.m. acid.

„ 6 a.m. acid.

„ 8½ a.m. acid.

„ 10½ a.m. acid.

„ 11½ a.m. acid.

„ 1½ p.m. acid.

Ext. Col. c., gr. x, primo mane quotidie.

12th. Vomited about one pint of yeasty, sour matter, containing sarcinæ, at 4 a.m. The pain in the stomach was not so much as usual.

Water passed at 5 p.m. alkaline.

„ 7½ p.m. alkaline.

„ 9 p.m. acid.

„ 1½ a.m. acid.

„ 4 a.m. alkaline.

„ 6 a.m. alkaline.

„ 8½ a.m. slightly acid.

„ 11½ a.m. quite acid.

13th. No sickness, no pain. Tongue scarcely furred. Feels much easier in the stomach.

Water passed at 7½ p.m. slightly alkaline.

„ 1 a.m. slightly acid.

„ 4 a.m. more acid.

„ 5 a.m. acid.

„ 7 a.m. acid.

„ 9 a.m. acid.

„ 11½ a.m. more acid.

14th. Had more pain and sickness last night. Vomited three times, at 2, 4, 7, a.m.; the first time very little; the two following about a pint each time. Bowels open.

Water passed at 5 p.m. alkaline.

„ 7 p.m. acid.

„ 10 p.m. acid.

Water passed at 2 a.m. acid.

„ 7 a.m. acid.

„ 9 a.m. alkaline.

„ 12 alkaline.

P. in med., meridiæ, vespere, nocteque.

15th. No sickness. Bowels open. Slept better.

Water passed at 8 p.m. alkaline.

„ 5 a.m. alkaline.

„ 7 a.m. very slightly acid.

„ 9 a.m. slightly acid.

„ 11 a.m. acid.

16th. No sickness; no pain. Bowels well open.

Water passed at 9 p.m. acid.

„ 2 a.m. acid.

„ 7 a.m. acid.

„ 9 a.m. acid.

„ noon acid.

17th. Vomited about a pint of very yeasty substance at 2½ a.m.

Water passed at 4 p.m. acid.

„ 2 a.m. acid.

„ 7 a.m. alkaline.

„ 9 a.m. alkaline.

„ 1 p.m. acid.

Augeatur dosis Sodæ sulphitis ad ʒss.

18th. No sickness.

Water passed at 9 p.m. acid.

„ 1½ a.m. acid.

„ 6½ a.m. acid.

„ 8½ a.m. acid.

Extra bread.

19th. No sickness. Feels much more easy. Bowels not open. The urine was acid each time it was examined.

20th. No sickness. Urine was acid each time examined.

21st. No sickness, but he suffered from a great deal of pain and fulness of the stomach in the evening.

Water passed at 9 p.m. alkaline.

„ 4 a.m. slightly acid.

„ 6 a.m. acid.

„ 10½ a.m. acid.

22d. No sickness. The urine, each time it was examined, was acid. Complains of slight œdema of the legs.

23d. Has had no sickness and no pain.

Water passed at 9 p.m. alkaline.

„ 2 a.m. acid.

„ 7 a.m. acid.

„ 9 a.m. acid.

„ 12 a.m. alkaline.

„ 2 p.m. alkaline.

24th. Last evening he had a great deal of pain, and vomited about midnight a pint of the same acid yeasty matter as heretofore. Bowels not open.

Water passed at 9 p.m. alkaline.

„ 12 p.m. acid.

„ 7 a.m. acid.

„ 9 a.m. alkaline.

Pil. Cambog., Ext. Colocy. Co. āā, gr. v, primo mane quotidie. Extra roast slice. Ordinary bread.

25th. No sickness. Passed much water. No pain.

Water passed at 9 p.m. alkaline.

„ 4 a.m. acid.

„ 7 a.m. acid.

„ 10 a.m. neutral.

26th. No sickness and no pain.

Water passed at 9 p.m. alkaline.

„ 12 p.m. acid.

„ 5 a.m. acid.

„ 7 a.m. more acid.

„ 9 a.m. most acid.

27th. No sickness. No pain. Bowels not open.

Five specimens examined, passed from 9 p.m. to 1 p.m.: the first was slightly acid; the others increasingly acid until 1 p.m. this day, when the urine was very acid.

28th. No sickness. Bowels not open.

The urine was acid each time it was examined; light coloured, and very clear.

He went home, at his own request, relieved.

Richard H—, æt. 38, carter. A stout and ruddy Welchman. Admitted June 6th, 1850; York Ward. For many years was in the habit of drinking beer to excess, sometimes being drunk for a whole month. About six years ago he became a steady man. He first felt uneasiness in his stomach about fifteen years ago, at times amounting to severe pain. Vomiting did not occur oftener than once a month. Says that he always felt worse in the spring of the year, and better in the winter. The intervals at which the vomiting recurred became gradually shorter, and the amount of fluid ejected increased in quantity. For the last fourteen months the amount of fluid vomited has been excessive, often two or three quarts, and of almost daily occurrence; but until last winter he has been free from sickness for two months at a time, during which he had no pain or uneasiness of the stomach.

Usually he feels comparatively well in the morning; about two or three in the afternoon his abdomen begins to be distended, and a rumbling sound may be heard in the bowels; this increases until eight or ten in the evening, when he ejects an intensely acid fluid, which has a frothy head like yeast. After this he feels well, eats with appetite, and feels comfortable until the following afternoon.

On admission he complained of severe pain in the left side and epigastrium, and of great constipation of the bowels. No tumour could be felt in the abdomen.

At first only Ext. Colocy. Comp., gr. x, omni nocte, were ordered. He was given ordinary diet, without beer or potatoes.

The vomiting usually occurred between nine and twelve at night, and not unfrequently he vomited in the forenoon as well as at night. Sarcinae and torulae were always present in the matter vomited, and in the faeces.

On the 17th of June attention was directed to the state of the urine. He had vomited at 8 a.m. and at 1½ p.m. The urine, examined at 2 p.m., was found to be highly alkaline. Blue paper remained blue when it was dried; red test paper became blue, and remained so when dry.

June 18th. Vomited at 11 p.m. last night and 8 a.m. this morning.

Urine passed at 7 p.m. last night was alkaline from fixed alkali.

„ 3 a.m. this morning alkaline, and contains a phosphatic deposit; crystals of triple phosphate can be found.  
No trace of mucus or pus.

June 19th. Has not vomited.

Urine passed yesterday at 5 p.m. alkaline, pale, clear.

„ „ 8 p.m. alkaline.  
„ to-day 6 a.m. alkaline.  
„ „ 2 p.m. alkaline.

20th. Vomited at 5 a.m. and 1 p.m.

Urine passed at 5 a.m. alkaline.

21st. Vomited at 4 a.m., 11 a.m., and 1½ p.m.

Urine passed at 4 a.m. }  
„ 1 p.m. } alkaline.  
„ 6 p.m. }

22d. Vomited at 1 p.m. and at 7 p.m.

Urine passed at 6 a.m. alkaline.

„ midday, slightly acid.

24th. Vomited at 7 a.m. and 11 p.m.

Urine passed at 8 a.m. slightly acid. Specific gravity 1030.

The last vomiting was much more than usual, and perfectly black from sulphuret of bismuth, formed from nitrate of bismuth, of which he was taking a scruple thrice daily.

25th. Says that he felt much worse the whole of yesterday, but that he has been much relieved by the vomiting. Complains of hunger.

Urine passed at 7 a.m. and 11 p.m. highly alkaline. Specific gravity, 1030. Vomited at 11 p.m.

29th. Urine passed at—

2 a.m. alkaline.

1 p.m. acid.

Vomited at 11 p.m.

30th. Vomited at 10 a.m.; fluid, very black.

July 2d. Has not been sick since the 30th.

xxxv.

Urine passed at 8 p.m. yesterday is more acid than any hitherto observed; crystals of uric acid and urate of ammonia granules were seen in it.

Urine passed at 5 a.m. very slightly acid.

Vomited at 2 p.m.

3d. Has passed a very bad night, from pain in the epigastrium.

Vomited last night at 6 p.m.

„ this morning at 3 a.m.

„ 12

„ 1½ p.m.

Urine passed at 2 p.m. alkaline.

He remained in the house until the 19th of August, when he returned to Wales without relief.

These two cases are very far from showing those hourly variations of the acidity of the urine which, in a more healthy state of the stomach, may be proved to depend on the state of digestion: the disease of the stomach leads to a most convincing proof of the influence of the acidity of the stomach on the reaction of the urine. When an excessive quantity of acid fluid was thrown out of the stomach, an alkaline state of the urine was produced. When most acid was ejected from the stomach, the urine was then most alkaline; and the alkalescence of the urine was lessened or was made to disappear when the vomiting was stopped.

The disease of the stomach which existed in these cases most certainly retarded the absorption of the digested food, probably by preventing it from passing out of the pylorus; and, judging from the variations of the state of the urine, it appears to me to be very probable that, in these cases, the secretion of gastric juice did not so immediately follow the taking of food as it does in the state of health.

The slow absorption of the acid and the sluggish secretion of it may be the causes that hindered the immediate effect of food on the variations of the acidity of the urine from being apparent. Moreover, these lesser variations may be partly lost in the greater effect produced by the removal of pints of acid fluid from the stomach.

However, the broad outline of the two cases is too marked

to be overlooked. In the first, when there was vomiting of acid fluid twice a day, the urine was frequently alkaline from fixed alkali; when the vomiting became of rare occurrence, the urine was generally acid, rarely alkaline. In the second case, in which the vomiting occurred three or even four times daily, the urine was almost constantly alkaline from fixed alkali.

That the occurrence of *sarcinæ* in the fluid vomited has no direct relation to the alkalescence of the urine, may be shown—1st, by the occurrence of constant acidity of the urine in other cases in which *sarcinæ* were vomited; and, 2dly, by the occurrence of alkalescent urine when the vomited matter was perfectly free from *sarcinæ*.

Ist. In much slighter cases of the disease of the stomach in which *sarcinæ ventriculi* occur, no alkalescence of the urine may be detectable; of this the following case may be taken as an example:

M. de M—, æt. 42, admitted January 22d, 1851; York Ward. Has been out of health about three years, but during the last three or four months he has been suffering every evening, about seven or eight o'clock, from sickness, and a quantity of sour water, mixed sometimes with matter like yeast, was brought up. He does not think his food is vomited. During the last four months he has wasted much. His face is thin and wasted; his tongue is excessively coated; his pulse is feeble and quiet; there is great resistance over the abdomen, and the superficial veins are large. He was ordered—

Bismuth. Trisnitr., gr. x, ter die.

Acid. Hydrocyan. dil., Ph. L., ℥ vj;

Sodæ Carb., ʒss;

Aquæ, ʒij. Urgente vomitu.

25th. He was sick twice during the night; the matter brought up was very acid, and somewhat resembled yeast in smell and appearance; *sarcinæ* were discovered without any difficulty. Magnesiae, ʒss, omni mane.

26th. Tongue quite clean; pulse small, very soft; appetite good; urine plentiful, acid.

27th. Bowels have acted three times. Urine healthy.

Feb. 3d. He has been rather sick the last two nights. The first night the draught stopped the sickness, but last night it had no effect, and he vomited a small quantity of thin watery fluid, in which I could not find any sarcinæ. Bowels relaxed; pulse quiet; no pain.

7th. Bowels rather confined; no sickness; sleeps well; appetite good; tongue clean; pulse quiet; urine very free, pale, acid.

8th. Went out relieved.

Idly. Urine may be alkaline from fixed alkali, in cases in which the matter vomited is perfectly free from sarcinæ.

Ann P—, æt. 39; married, and has had nine children. Admitted, under Dr. Wilson, October 8th, 1851; Queen's Ward.

Cachectic look, sallow complexion, face thin and emaciated; pulse very rapid and exceedingly feeble; breathing very hurried; tongue rather pale, clean; abdomen soft; muscles not over resistant; no tumour to be felt in the abdomen.

For three years she has been subject to sickness, which has been more or less constant the last five months. Within the last two months the vomiting has become much more distressing and more frequent; and at times she has likewise had severe pain in the epigastric region, and also in the left hypochondrium and back; occasionally there is a large swelling in the left hypogastric region; distension of the stomach, from flatus, probably.

Latterly she has become very much thinner, and likewise weaker. She has a very good appetite; but vomiting occurs in about four or five minutes after taking any food whatever, whether liquid or solid. She does not feel thirsty. The bowels are open, the motions solid and large. The urine free, and of natural colour. Sleeps badly. Catamenia regular, pale, and offensive. She states that the vomited matter is dark, and like coffee-grounds.

9th. No sarcinæ to be found in the matter which she

vomits. It is not, and she says never has been, yeasty. Two scruples of sulphite of soda were ordered thrice daily.

12th. Not the least improvement.

15th. No sarcinæ to be found in the vomited matter.

Nov. 2d. Has had a good deal of pain in the abdomen all night. Feels relieved by an injection which was given this morning. The sickness much the same: the matter vomited is not yeasty, contains no sarcinæ, is more fluid, and does not smell sour.

3d. Severe pain in the abdomen last night, but is much better now. She has been very sick; the vomiting began at 5 p.m. yesterday, after some coffee, and since then she has been sick very often. The matter ejected is highly acid.

The urine passed at 4 p.m. yesterday is alkaline, and red test paper remains blue when dry.

„ 7 p.m. „ is alkaline; on the surface there is a pellicle of phosphate of lime in plates and no prismatic crystals of phosphate of ammonia and magnesia.

„ 7 a.m. to-day is alkaline with the same iridescent pellicle.

4th. She is much more cheerful and lively this morning, and says she is better. No pain in the abdomen; much less sickness; no headache; pulse very feeble; tongue clean; very pale; breathing short when she speaks. Vomited at 4 p.m. yesterday, and often since; matter ejected thin, and highly acid.

Urine passed at 8 p.m. yesterday, alkaline, dark colour, with phosphate of lime on surface.

„ 12 p.m. „ alkaline, pale colour, slight pellicle.

„ 7 a.m. to-day, alkaline, no pellicle.

5th. Much pain in the abdomen, with sickness, which began at 4 p.m. yesterday, and it has been very frequent since. The matter vomited is highly acid.

Urine passed at 3 p.m. yesterday, alkaline.

„ 8 p.m. „ alkaline.

„ 12 „ alkaline.

„ 8 a.m. „ alkaline.

Scarcely any iridescent pellicle on any of these specimens.

6th. Sickness not at all less. Pulse small and feeble. She has been so sick "she cannot say when it began and when it ended." Some bottled stout ordered.

Urine passed at	1 p.m.	yesterday,	alkaline.
"	4 p.m.	"	alkaline.
"	12	"	acid.
"	9 a.m.	"	alkaline.

7th. Has not been sick since she had the stout at 12 midday yesterday; is more cheerful; bowels open; sleeps well; pulse very feeble; occasional pain in the abdomen.

Urine passed at	1 p.m.	yesterday,	acid.
"	5 p.m.	"	alkaline.
"	8 p.m.	"	acid.
"	7 a.m.	"	feebly acid.

9th. Has had a return of sickness, at 5 p.m. yesterday, after tea.

Urine passed at	4 p.m.	yesterday,	alkaline.
"	7 p.m.	"	alkaline.
"	5 a.m. to-day,		acid.
"	7 a.m.	"	acid.
"	12½	"	very feebly acid.

10th. Feels great weakness. Has occasional paroxysms of pain in the abdomen. Pulse exceedingly feeble. Was sick all yesterday, and also very frequently during the night. Feels very thirsty, and anything she takes instantly makes her sick; as soon as she took breakfast this morning was sick; the matter vomited was highly acid.

Urine passed at	4 p.m.	yesterday,	alkaline.
"	8 p.m.	"	alkaline.
"	2 a.m. to-day,		alkaline.
"	9 a.m.	"	alkaline.
"	2½ p.m.	"	alkaline.
"	4 p.m.	"	alkaline.
"	7 p.m.	"	alkaline.

On examination after death, which occurred in a few days, excessive thickening and ulceration of the pylorus was found to exist.

In conclusion, the practical point of my Paper is this:

If the stomach does so directly influence the reaction of the urine as to cause it to be alkaline at one hour and over acid at another hour of the same day, then the prescription of acid or alkaline medicines must never be made to depend on the reaction of the urine passed at any one period of the day; for at one hour acids may appear to be indicated, and at another alkalies. Moreover, if acids be given to correct the alkalescence of the urine at one hour, they will increase the acidity of the urine which will be passed when digestion is completed; whilst, if alkalies are given to correct the increased acidity after digestion, the urine will become more alkaline during the period of digestion. Hence, the reaction of the total quantity of urine passed in 24 hours ought to determine the prescription of acids or alkalies, when their chemical action on the urine is required; whilst the hourly variations, if excessive, must be controlled by directing our remedies to the stomach, and not to the kidneys.

I cannot finish this paper without expressing my thanks to Dr. Jenner for his suggestion and example in the use of the sulphite of soda, which enabled the patient, whose case I first related, to leave St. George's Hospital, saying that he was better than he had been for eighteen months.



A CASE  
OF  
CONSTIPATION OF NINE DAYS' DURATION  
FROM  
SCIRRHOUS RECTUM,  
RELIEVED BY OPENING THE SIGMOID FLEXURE OF THE COLON  
IN THE LEFT GROIN.

BY  
JOHN ADAMS,  
SURGEON TO THE LONDON HOSPITAL.

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Received Nov. 11th, 1851.—Read Feb. 10th, 1852.

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July 21st, 1851.—I was requested by Mr. Kennedy, of Stratford, to meet him in consultation on the case of a lady, æt. 35, whose bowels had been constipated four days. She was a person of a delicate frame, pale, and somewhat emaciated; the mother of four children; and was hereditarily predisposed to cancer, her mother and a sister having died of the disease. For some years she had experienced considerable difficulty in managing her bowels, and had suffered great inconvenience in expelling her fæces: this was always accomplished with pain and straining, and her motions were never properly moulded. She had also occasionally passed blood with her stools, and was much troubled with hæmorrhoids.

About half a year ago she consulted a surgeon, in consequence of the symptoms just detailed, who made an examination, and pronounced the case one of carcinoma of the rectum, with ulceration. She had also consulted various physicians of eminence, in consequence of the irregular state of her bowels. From the account given by Mr. Kennedy, her usual medical attendant, it appears that lately she had

been much better than usual, and had gained somewhat in flesh ; but that a few days prior to the constipation of her bowels, she had an attack of diarrhœa, which ceased on the 17th, and since this nothing has passed *per anum*.

When I first saw her, I was informed by Mr. Kennedy that no motion had passed for four days, and that she had vomited almost every thing she took, whether of food or medicine. From the previous history of the case, there could be no doubt that she was labouring under some serious organic disease of the lower part of the intestinal canal, and, as a variety of means had been employed, both by way of purgatives and injections, without success, my advice was requested.

I found her with a placid countenance, not indicative of much suffering; the pulse rather frequent; the tongue moist and red, without heat of skin; her abdomen was moderately, but not excessively, distended and tympanitic; there was no pain on pressure; we fancied we could trace the course of the colon from its ascent to its descent, but its outline was not accurately marked. She suffered much from occasional cramps in the intestines, and we could distinguish the spasmodic action of their muscular coat through the parietes. We contemplated the probable necessity of an operation, but agreed to wait as there was no urgency in the case. A scruple of calomel was administered, and an injection of warm water was thrown up, which came away in ten minutes slightly tinged with blood, and containing a quantity of flocculent mucus. In passing the tube of the syringe, it was found that fourteen inches had entered the rectum, but that a portion of the tube had become twisted spirally in the gut, so that it was impossible to say to what extent of intestine the instrument had passed: there was no evidence of scirrhus within reach of the finger. The calomel was repeated in the same dose on the day after I first saw her, and it was subsequently increased to two scruples, but without any effect either decidedly beneficial or injurious, although it appeared to allay the tendency to vomit. She

was directed to take light nourishment in small quantities, and to moisten her mouth with ice constantly.

It would be tedious to describe minutely the treatment pursued from day to day: it consisted in the occasional use of injections, and small doses of morphine were administered when the stomach became unusually irritable; and the only change from these palliative means consisted in the exhibition of half a pound of metallic mercury, a small quantity of which speedily passed *per anum*, but the bulk remained behind.

She continued much in the same condition until the evening of the 21st, when, the symptoms having increased in severity, I was requested to see her, as her medical attendant thought the time had arrived when further delay was likely to be injurious, and that something operative ought to be had recourse to at once. I therefore saw her in consultation with Mr. Luke and Mr. Kennedy, and acquiesced in the propriety of opening the sigmoid flexure of the colon in the left iliac region. I made an incision of about two and a half inches parallel with the epigastric artery, at about half an inch internal to the anterior superior spinous process of the ilium, the lower end of which terminated just above Poupart's ligament. The peritonæum having been carefully opened, above half an ounce of serum escaped: a portion of distended small intestine protruded, this was replaced, and on introducing the forefinger, the descending and sigmoid flexure of the colon could be felt undistended, and of their natural size. On passing the finger along the colon downwards towards the rectum, a hard tumour could be distinguished in the upper part of this gut.

The sigmoid flexure of the colon was now pulled through the opening, and having been retained in the position by a ligature passed through an appendix epiploica, an opening an inch long was made in it, when a small quantity of fluid fæces and air escaped: the gut was now stitched by two sutures to the integuments, and the

patient was placed in bed. I passed my forefinger downwards into the intestine, and could feel a fleshy mass almost completely filling the calibre of the upper part of the rectum. A fomentation was ordered to the abdomen, and the wound was kept clean by sponging away the feculent matter as it made its escape.

On visiting her the day after the operation, I found that a large quantity of feculent matter had escaped, by which she was much relieved, and the distension of the abdomen had in a great measure subsided. She had not vomited since the operation, and expressed herself much better in every respect. A large quantity of fluid mercury had escaped with the feculent matter. She had taken a small quantity of wine and beef-tea, with a little soda water. There was not the slightest tenderness in the abdomen, and the pulse, although rather quicker than before, was quite soft; her tongue was red and moist, and there was no tenderness in the gums.

I saw her in about fourteen days after the operation, and found that she had continued to discharge freely the contents of the bowels through the wound, and that a large quantity of metallic mercury had passed, and that there was a tendency to diarrhœa, which had been checked by small doses of aromatic confection. The abdomen was quite free from pain and tension. Her tongue and mouth were sore, apparently from the calomel; her countenance was cheerful, her pulse calm. I removed the ligatures which were quite loose. She had passed some thick slimy matter by the rectum tinged with blood; she thinks also that a small quantity of feculent matter had passed as well as some of the mercury, and some flatus had escaped with an audible noise. She was directed to take strong broth, beef-tea, and arrow-root, and two glasses of Port wine with water daily.

A few days ago, I received the following communication from Mr. Kennedy, in answer to my inquiries as to her present condition:—"I have nothing to add to the previous account, but to say that the operation has been entirely

successful, and, although the disease which demanded the operation still exists, and I presume will ultimately terminate her life, she is improving daily in health and spirits; the artificial anus gives very little trouble, and she is able to attend to it herself, in which respect the opening in the groin is much superior to that in the loins. Two ounces and a half of the mercury came away per anum five weeks after it was swallowed, which proves incontestably that in the metallic state it is quite innocent."

I have since ascertained that the tendency to discharge the contents of her bowels occurs twice in the twenty-four hours, and that there is still a frequent discharge of offensive slimy mucus from the rectum. Her general health has wonderfully improved, and she is now making flesh.

Of the nature of the disease in the case I have just had the honour to detail, there could be no doubt: the previous history of the symptoms, and the evidence afforded by the resistance, to the passage of the rectum-tube, at once indicated, as accurately as possible, the precise locality of the obstruction, and hence it only remained to determine the *modus operandi* for the relief of so formidable a condition. It seemed to me that the operation to which I had recourse was, at any rate in this instance, quite admissible, inasmuch as in all probability the intestinal tube was healthy above the rectum.

With regard to the comparative merits of this operation and that of Amussat, the subject appears to have been so fully considered by my colleague, Mr. Luke, in the last number of the Society's Transactions, that I will not occupy the valuable time of the Society by reiterating the forcible arguments in favour of the anterior operation contained in that gentleman's communication.

I cannot, however, omit the opportunity of expressing my opinion that the danger arising from opening the peritonæum is in a great measure obviated by the blocking up of the opening by the protruded intestine, as, the peritoneal surfaces being thus brought into contact, adhesion takes place

so rapidly and so completely, that the peritoneal opening is speedily closed, and all communication with the exterior is effectually prevented.

It will be seen in this case that the continuity of the intestinal tube was not completely obstructed, as a small quantity of fluid mercury passed *per anum* soon after its administration: this might have led to the error of the belief that the natural function of the canal was about to be restored; but a little consideration soon convinced me that the hope of speedy relief was not to be encouraged, as, although a small quantity of fluid so subtle as crude mercury might readily pass, I could not expect that the gut could transmit its natural contents under its peculiar circumstances. The administration of so large a quantity of crude mercury is a practice, although advised by myself, I find some difficulty in justifying: the doubt and obscurity which overhangs most, if not all, cases of intestinal obstruction, must plead my justification for employing a means of such a questionable character. That no harm resulted from its use, is at once apparent; and there can be no doubt that, previous to the operation, the greater part of it had made its way to the seat of obstruction, beyond which only a very small quantity had proceeded, the bulk being retained to be passed some weeks after its administration, in an unaltered condition, producing no injury whatever to the patient.

There is but one other point to which I consider it necessary to refer, namely, to the great relief afforded to the local disease by diverting the flow of fecal matter into a new channel, thus removing one great source of severe irritation—and hence the suggestion arises as to the feasibility of a similar proceeding in cases of ulcerated cancer of the rectum.

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POSTSCRIPT, *July 17, 1852.*—The patient, for two or three months after the operation, appeared to recover in health; her stomach and bowels performed their functions so satisfactorily, that Mr. Kennedy, her medical attendant, hoped

her disease had become latent: but these favorable symptoms declined gradually; she complained of pain in the tumour, her appetite failed, and her bowels ceased to act without medicine; her bladder also became very irritable. She died, gradually exhausted, on the 13th of July: the opening in the groin having given no pain whatever. Her fæces were discharged with facility through it; a small quantity occasionally passing per anum.

*Post-mortem.*—The upper part of the rectum was the seat of carcinomatous ulceration, adhesion having taken place between it and the parietes of the pelvis, so that no escape of fæces had occurred into the peritoneum. The left ovary was occupied by a mass of colloid cancer: and the right ovary (which had formed a fluctuating tumour in the groin during life) was occupied by a large cyst filled with fluid. The liver was studded with scirrhus tubercles. The adhesion between the sigmoid flexure of the colon at the seat of the operation was perfect; and the small intestines and omentum had become adherent in its vicinity.



REMARKABLE CASE OF  
FOREIGN BODIES IN THE STOMACH  
AND DUODENUM,

COMPLETE OBSTRUCTION OF THE BOWEL, AND MECHANICAL  
DISPLACEMENT OF ORGANS.

BY  
JOHN MARSHALL, ESQ.

COMMUNICATED BY  
THE PRESIDENT.

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Received Nov. 15th, 1851.—Read Jan. 13th, 1852.

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Mrs. B., æt. 41, the wife of a corn dealer, residing at B—, in Oxfordshire, was a rather tall, well-formed woman, of fair complexion, good intelligence, and habitually benevolent to the poor.

In the year 1844 I first attended her in childbirth. The labour was natural, and she soon recovered. My father had previously been her medical friend, and was with her at the birth of five children; a fortnight after the birth of the fifth child, in December 1842, she was affected with hæmatemesis, vomiting a wash-hand basinful of blood. During the succeeding forty-eight hours she lay in a state of total unconsciousness, pupils greatly dilated, and the pulse scarcely perceptible. The vomiting did not return, and she slowly recovered, but her countenance ever after was sallow.

In the autumn of 1845 I found her complaining of frequent sickness, with pain at the epigastrium, and in the left groin. On examining the abdomen, I discovered a hard tumour in the left iliac fossa, which moved freely across the

abdomen, as she turned from side to side. The size and shape of this tumour were very like an ordinary placenta, one edge much thicker than the other; the thickest edge much harder, and imparting to the fingers the feeling of its being very heavy. She stated that she had felt this substance for some months, and whenever she turned in bed it always moved, and caused nausea, but gave her no pain when she was quiet, nor was it tender to the touch. She suffered much from flatulence, and pain between the shoulders shooting through to the left breast. The catamenia had not appeared for three months, and she believed she was pregnant. The bowels were torpid, and she was obliged frequently to take her usual aperient of blue pill and colocynth. The nausea increased, and the stomach rejected everything; large quantities of a green ropy mucus, occasionally with blood, were thrown up, all of which was carefully examined, without detecting anything which would throw light on the case. Numerous remedies were employed to allay her distressing sickness, but were all equally unavailing, and the emaciation and exhaustion became so great, that her death was daily expected. One teaspoonful of pale brandy was now given every hour, and not an atom, or drop of anything beside. From this time the vomiting ceased. After continuing this for two days, a little food was allowed, and she gradually gained strength and flesh, and in four months was able to walk two miles, and looked almost as well as usual.

During this illness, Dr. Cowan, of Reading, visited my patient; he was greatly interested in her case, and expressed himself to be as much puzzled as I was respecting the nature of the tumour, which he compared to a cannon ball rolling across the abdomen.

Nearly five years elapsed before any serious symptoms returned. The pain between the shoulders was often complained of, and there was occasional sickness. Much difficulty was experienced in keeping the bowels in order; the secretions were generally healthy in colour, and formed.

Occasionally the face and limbs became œdematous, but an aperient pill, with a little gin in gruel taken at bedtime, would always remove these symptoms in two or three days. The catamenia never returned after the illness of 1845.

On the 8th of October, 1850, I again saw her in consultation with Mr. Corsellis, of B—. From him I learned that she had been ill three weeks, that all her old symptoms had returned. Incessant vomiting, with pain between the shoulders, had reduced her to a state of great weakness and emaciation. A few hours after my visit, severe spasmodic pain came on in the bowels, and quickly terminated her sufferings.

*Post-mortem.* — Eighteen hours after death, with the assistance of Mr. Corsellis, I examined the body. The thoracic viscera were healthy, and free from adhesions. On opening the abdomen the stomach was found drawn down to the pubes, and in its form resembled a champagne bottle. The pyloric end lay beneath the arch of the pubes, and the duodenum under a portion of the sigmoid flexure of the colon, from which it was traced to the pancreas, which was drawn down considerably out of its normal position. The liver was large, and paler than natural. The gall-bladder distended with bile. The spleen and pancreas were healthy, but small. The kidneys rather hypertrophied. The bladder small. The uterus and ovaria healthy. The intestines were of very small calibre. The cæcum and colon resembled the small intestines, the bands and sacculated appearance being scarcely discernible. The jejunum and ileum contained a little ropy mucus, and there was some faecal matter in the rectum. No ulceration was apparent throughout the whole length of the intestinal canal, nor was there found the slightest peritoneal attachment or appearance of inflammation within the cavity of the abdomen.

Having tied the œsophageal end of the stomach and the duodenum, I removed these organs. The stomach contained about a pint of semi-fluid matter, and felt very

like the crop of a fowl; the duodenum resembled a large sausage stuffed with lead. On cutting into the stomach I found it partially filled with some gruel-like fluid, and in the lower half,—which evidently constituted the tumour during life,—an immense number of pins, of a purple black colour, not corroded, varied in size, all bent or broken, many very pointed. The pyloric half of the stomach presented a remarkably thickened condition of the villous coat, being highly vascular, and raised in rugous elevations like the stomach of an ox. The muscular coat also was greatly hypertrophied. The weight of the pins contained in the stomach was *nine ounces*. An incision made into the duodenum *displayed a mass of pins very tightly packed, of various shapes, similar to those found in the stomach, and wholly obstructing the tube*. These weighed a *pound*, as nearly as I could ascertain without removing them.

Her husband could scarcely believe the truth of what he saw, when we showed him the contents of the stomach, for he affirmed that he had never seen his wife put pins into her mouth. A son, 17 years of age, said that he had often observed his mother biting pins, and believed that she swallowed them. She took them out of her thimble with her tongue, having previously bent the head and point together. When his mother corrected him for any bad habit, he would say—Why do you eat pins? This reply always silenced her. He stated that the servants when shaking the carpets frequently remarked on the number of bent pins they found.

Mrs. B— had a keen appetite, and would always partake of any food she fancied, however improper or indigestible. I have known her eat cold boiled pork when unable to raise herself in bed, having four days previously vomited a large quantity of blood.—Of her early history I can learn but little. A sister informs me that, when a child, she was fond of eating starch and slate pencil—and she remembers her biting pins. When seventeen years of age

she vomited blood, and remained for some months an invalid, until sent for change of air to Bath.

The view taken by my friend Dr. Cowan of this extraordinary case is so well and clearly expressed in a letter I received from him, and so entirely coincides with my own, that I append it.

READING; *Sept.* 5, 1851.

MY DEAR MARSHALL,—Your statement of the most remarkable and, I believe, unique facts of Mrs. B—'s case, has the great merit of being strictly accurate and trustworthy, and cannot fail to be classed amongst those rare and curious anomalies in medical experience, which however interesting to detect, are sadly baffling to our philosophy. From what I personally knew of Mrs. B—, there was nothing in her appearance, manner, or character, to lead me to suspect any form or degree of mental eccentricity; and the singular results of the *post-mortem* examination are, I think, to be referred to an inveterate but unconscious habit, and not to morbidity of thought.

I do not think she had the slightest suspicion of the real cause of her illness, nor that she would have hesitated to have confessed her apprehensions, had they been experienced. She probably accidentally swallowed the pins from time to time, without noticing or disregarding the fact, and during a long series of years the wonderful accumulation took place. The true interest of the case is clearly the impacted state of the duodenum, that bowel being wholly impervious to all solids, and but very slowly, if at all, permitting the percolation of any fluid.

How, under such circumstances, the functions of digestion could be discharged, solid food retained and assimilated, and natural faecal evacuations thrown off, are difficulties I do not feel prepared to explain; and are instances of adaptation beyond what I should have thought theoretically possible.

The appearance of the duodenum proves beyond a doubt its gradual and long-continued obstruction; and though it is easy to assert that the stomach, under such circumstances,

did all the work, and that the evacuations were wholly excreted, yet I confess the departure from ordinary conditions is so extreme, that I prefer admitting my ignorance, rather than attempting a solution. No doubt, some ingenious physiologist will strive to enlighten the darkness, but my confidence in clever speculation is infinitesimally small.

Very faithfully yours

CHARLES COWAN.

A  
SUCCESSFUL CASE OF PARTURITION

IN A PATIENT WHO HAD PREVIOUSLY UNDERGONE "OVARIOTOMY"  
BY A "LARGE INCISION."

BY  
JOHN CROUCH, M.R.C.S., BRUTON, SOMERSET.

COMMUNICATED BY  
SAMUEL SOLLY, F.R.S.

Received Nov. 24th.—Read Nov. 25th, 1851.

Fanny Gould, the subject of the above case, is now a fine healthy young woman, twenty-six years of age. In August, 1849, I extirpated, by a peritoneal section of nine inches, a multilocular ovarian cyst, weighing fourteen pounds, and containing not less than two hundred separate cavities. The operation and its subsequent treatment are described in the 44th volume of the 'London Medical Gazette,' and in the 'Provincial Medical and Surgical Journal' for 1849. The tumour consisted of an hypertrophy of the left ovary, the cells of which contained an albuminous fluid of various consistencies. The fimbriated extremities of the left Fallopian tube were also much enlarged, and contributed a considerable portion towards the diseased mass. The patient's history from the above period is as follows:—About five weeks after the operation she walked the distance of five miles, to inspect the preparation of the tumour which had been extracted from her. During the next winter, the catamenia appeared at regular intervals, and her general health continued good, with the exception of an occasional pain in the left groin, and a

slight difficulty in micturition, sometimes followed and relieved by a muco-purulent discharge in the urine. In April, 1850, she fulfilled an engagement made previous to the operation, and entered the married state. In January, 1851, the menses ceased, and, in a short time subsequently, the ordinary symptoms of pregnancy commenced. These were of a mild and healthy character,—indeed she never enjoyed existence more than during her period of gestation. The pain in the left groin, (opposite the part where the pedicle of the tumour had been tied,) the difficult micturition, and the deposit in the urine, entirely ceased. On the 9th of October, 1851, two hundred and eighty-two days from the termination of the last menstrual period, she was, after a lingering labour, safely delivered of a male child, weighing seven pounds. The infant was born in a state of asphyxia, with the umbilical cord tightly encircling its neck, but soon after the pressure was removed, it gave vigorous signs of life.

One fact connected with the cicatrix on the abdomen of the mother is not unworthy of notice. It was previously feared that the expansive powers of the parietes of the bowels would be impaired by so large a scar passing through their centre. I was therefore agreeably surprised to find that, not only did the surrounding skin dilate without tightness or puckering, but that the cicatrix itself had increased in length *three inches*, and in breadth *one sixth of an inch*, during the period of gestation,—thus affording an unusual and striking instance of the elasticity of newly-formed integument.

Fanny Gould has now been confined nearly seven weeks, and both the mother and child are doing well in every respect. The cicatrix on the abdomen has returned to the same dimensions as before the pregnancy, being five inches and a half in length and one quarter of an inch in breadth.

ON  
GRANULAR AND FATTY DEGENERATION  
OF THE  
VOLUNTARY MUSCLES.

BY  
EDWARD MERYON, M.D., L.R.C.P.  
LECTURER ON COMPARATIVE ANATOMY AT ST. THOMAS'S HOSPITAL.

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Received Nov. 28th.—Read Dec. 9th, 1851.

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It is with an earnest desire of performing the duty which I conceive attaches to every Fellow of this Society, of recording faithfully every case of more than ordinary interest, more especially when the phenomena of disease which occur during life can be associated with physical facts which present themselves after death, that I venture to claim your attention.

The Hon. Geo. P— was born in March, 1834, a fine and apparently healthy child: he was large and heavy, but not in the least degree disproportionate; he passed through the period of early infancy without more disturbance of health than is usually manifested during the process of teething, but walked late, a circumstance which was attributed to his size. He walked heavily, however, and never with any appearance of healthy elasticity. When tossed in his nurse's arms, or when lifted from the ground, he seemed to be a dead weight, having no power of assisting or jumping from the ground. This incapacity of springing was noticed by his father even before the heavy walk excited the slightest anxiety. He gradually improved in walking; but his movements were always of an inactive kind up to the age of six or seven, at which period he could walk a mile without resting.

His condition was wellnigh stationary until he was eight years old; if any change occurred, he rather lost ground than gained it. He ascended stairs with the greatest difficulty, by holding the balusters and dragging the leg which was furthest from them after him: this latter difficulty increased more rapidly than that of walking on a level surface. He was always disposed to trip, and could never make the slightest effort to recover himself. Between seven and eight he had hooping-cough, which neither affected his general health, nor did it produce any change in his power of walking. At nine he was placed under the care of a surgeon (Mr. T—), who supposed that there was deficient elongation of the spinal cord (such were his words), and consequently put him on a stretching-board. It was at first thought that he was slightly improved by this procrustean plan of treatment, for he could raise his foot from the ground, assisted by his hands, somewhat higher than he could before; but his general health began to suffer, and he was then seen by Sir Benjamin Brodie and Mr. Lawrence: this was in March, 1845, when he was eleven years old. At this period he could not walk a step—scarcely, indeed, could he stand—and, at the suggestion of Mr. Lawrence, he was placed under the care of Mr. Tamplin, who considered that much of the failure of power might be dependent on muscular retraction; and, therefore, he divided the tendo-Achillis of each leg and the tendons of four other muscles. About five weeks after the operation he walked, with the mechanical support which was applied to the feet and legs, but chiefly, as Mr. Tamplin has kindly informed me, by the flexors and extensors of the hip-joint, and once without irons he walked across a room unsupported. After that, however, he became gradually worse, losing by degrees the little power of walking which he had gained, and eventually of standing.

When I was consulted, in November, 1848, the power of the muscles of the upper extremities was diminishing also, notwithstanding that the muscular mass of the body and limbs did not appear to have diminished, but, on the contrary, he had grown well and had gained in flesh. At this

period he was taking, by the advice of Sir B. Brodie and Dr. Bright, the *Liquor Hydrargyri Bichloridi in Tinctura Cinchonæ Composita*; and, supposing that the symptoms might depend on a strumous constitution and deposition of tuberculous matter either in the spinal cord or its investing membranes, which has been sometimes observed in children, the same combination of medicines was continued at intervals for nearly eighteen months, during which time he was generally living on the coast; but, in spite of every care, he gradually lost power, and in December, 1850, whilst staying at Bournemouth, he was seized with what appeared to be a mild attack of fever, accompanied with nausea, giddiness, and a constant and profuse secretion of mucus from the trachea and larynx, (such was the report of Mr. Elgie, who attended him,) but with no mucous râle: there was an apparent paralysis of the pharyngeal muscles, repugnance to food, but constant thirst, a cool skin, with a pulse at 120, the breath having a cold, sickly odour; the urine loaded; the intellect remaining perfectly clear until the 19th, and on the 20th, at four p.m., he died. On the receipt of a telegraphic despatch, I proceeded, on Saturday, the 21st of December, accompanied with Mr. Tatum, to Bournemouth, where we examined the body twenty-two hours after death.

The body generally presented an emaciated appearance, more especially the lower extremities; the chest was compressed and flattened in front, and there was great lateral curvature of the spine. The knees and hip-joints were rigidly fixed in a bent position.

On examining the head, the dura mater was found a little more firmly adherent to the cranium than usual; the veins of the surface of the brain and those of the velum, as well as the sinuses, were gorged with blood, the sinuses containing a very loose coagulum. There was about an ounce of serum in the ventricles; and, with these slight exceptions, the brain was perfectly healthy.

The veins and sinuses of the spinal canal were turgid with blood, more particularly in the dorsal region; but the spinal cord itself and the membranes were perfectly sound

and natural in appearance. About from three to four ounces of serum existed in the spinal canal.

The thorax and abdomen were next opened, and their contents carefully examined. The heart was healthy, both as regards size and firmness, and its colour was also of a dark, healthy red; the relative thickness of its walls natural, and the arterial system generally free from any morbid appearance. The lungs were perfectly healthy; and the whole of the abdominal viscera, the solar and lumbar plexuses of nerves, all appeared quite natural and healthy.

It was thought, both by Mr. Tatum and myself, that the venous congestion and serous exudation of the brain and spinal column might have been, and most probably were, the result of the disturbance which immediately preceded death.

The chief structural change existed in the system of voluntary muscles, which was throughout the entire body atrophied, soft, and almost bloodless; and, although the muscular fibres *appeared* to exist, yet were they not of that deep red colour as seen in the healthy and natural state.

When the muscular tissue was examined under the microscope, the striped elementary primitive fibres were found to be completely destroyed, the sarcoous element being diffused, and in many places converted into oil globules and granular matter, whilst the sarcolemma or tunic of the elementary fibre was broken down and destroyed.

The colour of the voluntary muscles generally was of an ochery red; but, as the colour always varies according to the degree of development and activity, that physical character appeared of minor importance. It is well known, for instance, that the pectoral muscles of birds which do not fly are white, whilst the same muscles in birds of flight are red; and in the Teal, immediately after migration, they are intensely red. In carnivorous animals, again, the muscular mass is of a deeper red than in herbivorous animals.

Had the foregoing case occurred singly, and simply as I have related it, I should not have presumed to occupy your time and attention with the details which I have given;

but a second son, the Hon. G. Wr. P—, four years younger than the former, exhibited precisely the same physical condition and the same symptoms as did his brother at the same age; or if any difference existed, it was in the more rapid progress of the disease in the second son. In May, 1847, when nearly nine years of age, he walked from Bruton Street to Westminster Bridge, but in November, 1848, he could neither walk nor stand, and in 1850 his arms were fast losing power.

A third son, the Hon. Wm. P—, was born in 1845, a well-developed and healthy-looking child like the two former, but like them he always sat heavily on his nurse's arms. When able to walk he could never make the slightest spring, and in June, 1850, when in his fifth year, he was much in the same condition as were his brothers at that age. When placed on the stairs and told to go up, he would hold on by the balusters, raise one foot to the step above and drag the other after; the right foot being apparently dragged with most difficulty.

In this child considerable improvement has taken place during the last year, under treatment which I will presently describe; for he can now run somewhat freely, and make *small* jumps from the ground in a manner which neither of the former ever could do. He is moreover able to walk up stairs slowly without the assistance of his hands.

In 1849 a fourth son was born, smaller and thinner than the other three, and altogether unlike them, so that it was hoped he might escape their fate; but the lower extremities are certainly becoming thick, and the child seems heavy, and a dead weight on the arms. Still I do not think that his present state would excite the notice of any person unacquainted with the history of his brothers. These are the only boys in the family. There are six girls, aged respectively, 17, 15, 11, 10, 8, and 5; but none of them have shown the slightest tendency to the same form of disease. Two, however, have been the subjects of mesenteric disturbance; and this it was, combined with the usual physical characteristics of a strumous constitution in the

three eldest boys, which induced me to suppose that tuberculous matter might have been deposited on the investing membranes of the spinal cord, or in the cord itself; and in this idea I felt that I was supported by the researches of Lavéillé, Gendrin, Andral, and Ollivier, who have not only determined the fact of such tuberculous deposits in and around the nervous centres, but also that such disease is not common before the age of two years, after which, until puberty, it is of frequent occurrence.

A case reported to this Society by Mr. Stanley, and recorded in the 'Medical Gazette' of February 7th, 1840, shows that such gradual diminution and loss of muscular power may result from disease of the spinal cord independent of injury; and another case which fell under the observation of Dr. Budd, affords similar testimony; but in the first case which I have related, the spinal cord and nerves connected with it were carefully examined, and not the slightest trace of disease was detected. The relative proportion of the grey matter to the white in the cord, the ganglionic cells of the former, and the tubular structure of the latter, as well as of the nerves and the white substance within the neurolemma, wherever examined by the microscope, all bore evidence of the healthy condition of the nervous system.

I was therefore wrong in my diagnosis, for the nervous tissues had preserved their integrity; and the only structural change observed was that which presented itself in the muscular fibres, which were broken down, and converted into granular and fatty matter.

Now, in ordinary paralysis, the fat which accumulates in the muscles merely insinuates itself between, and occupies the place of, the muscular fibres; but, in the fatty degeneration, which is the subject of my Paper, as in fatty disease of the heart, so admirably described by Dr. Richard Quain, "a fatty matter, composed of granules and small oil globules, occupies and fills the sheath of what was formerly muscular fibre." Here then we have two modes in which fat accumulates in the muscles, as Dr. Quain has described, in corresponding conditions of the heart. In the one case,

the fat globules are deposited on the outside of the fibre, and in the other, the muscular fibre itself degenerates into granular and fatty matter. And this metamorphosed condition was so universal in the case in question, that it appeared in every voluntary muscle which I examined, except that the process of destruction had not advanced so far in the upper extremities and neck, where the transverse striæ were somewhat apparent, as in the abdomen and legs, where the striæ had almost entirely disappeared. Mr. Quekett kindly examined several portions of the muscles, and corroborated the observations made by Mr. Tatum and myself. In the muscular fibres of the heart, the transverse striæ were as discernible as in ordinary healthy hearts.

In considering the complex phenomena of disease in the human body, the great difficulty is manifestly that of singling out one only of the antecedents which concur to produce a given effect, and to point to that as the physical cause.

Now, if the cause of the phenomena which I have related were simply a defalcation of nervous energy, the fatty deposit would doubtless be interstitial, as in paralysis; but it is not so: and although we are ignorant of the physical conditions necessary for the deposit of fat, yet are there certain circumstances which appear to throw light on the phenomena in question. For instance in paralysis, the fat cells are formed and deposited simply from disuse; the organic elements, I conceive, are present; the assimilating process, moreover, appears to be sufficiently energetic to maintain the integrity of the sarcolemma; and the exercise only of the muscle seems to be wanting to preserve the healthy texture; whereas, in the fatty disease and degeneration of muscles, there appears to be a deficiency of the elements, probably of albumen and fibrin, for the necessary consumption of the peripheral system and healthy assimilation.

In illustration of this view I will relate the history of two cases, the subjects of which were sons of the Rev. Mr. H—, of Southampton, and with the particulars of which Dr. W. Bullar, of Southampton, has kindly favoured me.

Mrs. H— had a very delicate constitution, and had been seriously ill just before Mr. H. married her. She died eventually of peritonitis, the effect of tapping an ovarian cyst.

The eldest son, E. H—, was born whilst his mother was very ill, was partly nursed by her, and very badly nursed by others. He could not stand when he was two and a half years old, and at this time there appeared to be an entire cessation of growth; but about a year and a half after, he began to grow again slowly: he was, however, always *conspicuously* weak, as was also his brother, and in both it was observed that they never ran, jumped, or played with other children.

When between eight and nine years of age, they both manifested the same kind of muscular weakness which I have described in the other cases, except that the arms were affected before the legs. In both the diminution of power was most marked in going up stairs, which was effected by laying hold of the balusters with both hands, then leaning the head on the hands and fixing themselves in that bent attitude, they dragged their legs after them. They were taken to Interlaken, and placed under the care of Dr. Gugenbühl, where they improved at first and grew; but the walking powers soon diminished again, and eventually both became perfectly helpless. The eldest died during an attack of measles of pneumonia, and was examined by Mr. Partridge and Dr. Farish, when the lungs were found partially hepatized; all the other viscera were healthy, the nervous centres apparently so; but all the voluntary muscles were wasted, retaining a fibrous appearance, but were flabby and of a yellowish colour.

I have given the above in Dr. Bullar's own words, and I have been informed by Dr. Farish that the muscles generally appeared to have degenerated into fatty matter; but they were not examined by the microscope. The case is reported in the 'Medical Gazette' for November, 1847, by Mr. Partridge, who states that "the deltoid and sterno mastoid muscles had undergone fatty degeneration. The calves (which were larger than natural, and had, during the progress of the paralysis, become permanently contracted,)

presented a greater degree of fatty degeneration in their muscular structure than the upper extremities, the soleus and gastrocnemius being more affected also than the flexor longus pollicis; neither the nerves nor tendons had undergone change." I have also seen the father, who informed me that just before the loss of power became apparent, the limbs grew thick and heavy; from him also I ascertained, that he had two daughters, who were small in stature, but healthy and perfectly free from the disease in question. Now, in these two cases, the commencement of the paralysis in the upper extremities renders the spinal origin, I think, extremely improbable:—it is far more likely that there was an original weakness, or deficient action of the assimilating organs, or, in other words, an absence of those elements and influences which are necessary for a healthy organisation; antecedents which concurred to produce the fatty degeneration; or, as Dr. R. Quain has beautifully expressed it, "when the vital power which belongs to these higher products of animal organisation is weakened or destroyed, they yield to the physical and chemical influences which surround them, and by an inherent principle descend into a class which is shared by them in common with plants and minerals."

Two more cases of a similar kind have fallen under my observation during the last year.

Two brothers, named Tyrrel, living in the village of Playden, in Sussex, began to lose the muscular power of their legs when they were about twelve years of age, from which epoch they gradually became worse, and when they were twenty their legs were useless; their arms then began to fail them, and at the age of twenty-five both legs and arms were totally disabled. One of these was admitted into St. Thomas's Hospital, under the care of Dr. Barker, in 1847. There was a third brother similarly affected, who died some years ago, but, unfortunately, was not examined. A sister is living and perfectly well. As children, they were all ill fed.

Mr. Quekett has observed certain facts which tend to show that the mal-assimilation (if such be the cause) may be induced independent of original weakness. I am

informed by that gentleman that the ostrich is peculiarly obnoxious to this fatty degeneration of the voluntary muscles, and that he has examined some which have died in the Zoological Gardens after long confinement. When once they drop the keepers know that recovery is hopeless; and in all cases the muscular fibre is destroyed, and the sarcolemma broken down, as in the case which I have related.

Now the state of confinement is precisely that which would tend to affect the organs of assimilation, and to produce that derangement of nutrition in which Dr. Christison has detected oil globules in the serum of the blood; and inasmuch as the elements of these oil globules are admitted to be the complementary elements of the gelatino-albuminous principles employed in the nutrition of the various tissues, I think it a fair inference that this mal-assimilation is the antecedent, which, in all the cases I have described, has produced the consequent loss of power; but why in this peculiar form, or why so constantly in the male sex, are questions which I confess myself unable to answer.

It may be urged that I undervalue the influence of the nervous system in thus determining the cause of the effects which I have described; but inasmuch as there has been in all these cases an absence of symptoms denoting active nervous lesion; seeing, moreover, that the formative power of each and every tissue resides in itself and is altogether independent of nervous agency, and that muscular contractility is equally independent of the nervous centres, I do not think that I am departing from a strictly logical inference, in ascribing the disease in question to defective nutrition; and I am happy in finding myself supported in this opinion by men like Wurz and Paget, who regard fatty degeneration in general, not so much in the light of a new deposit, as of an unrepaired tissue falling into a state of atrophy and transformation.

The only diagnostic signs by which I can suppose that this disease can be distinguished, are,—1st, its very gradual and almost imperceptible progress, differing from the paralysis agitans in the absence of tremulous agitation; 2dly, the entire absence of symptoms which denote nervous dis-

turbance, as well as of paralysis of the bladder and sphincter, which usually accompanies paraplegia.

In propounding a system of treatment I have carefully considered the various causes, and have endeavoured to clothe each in circumstances (as far as such causes suffer themselves to be separated), in order to determine its individual share in the production of this fatty degeneration. I have, moreover, appealed to pathological phenomena, where (contrary to my preconceived opinion) was detected disturbance of one organic function, and consequent affection of other organs and functions in a fixed order of succession; and although I have attributed to a defective nutrition the greatest importance, I have not been unmindful of the *modifying* influence which the nervous system may possess. That influence is duly appreciated by Mr. Paget in the conditions which he lays down as necessary to healthy nutrition, and I have attempted to fulfil those conditions as far as it is possible in each case. In one I am induced to hope with success, for the boy is able to walk up stairs, run, and make a little spring from the ground in a manner he never could do before; but I fear it is impossible to restore healthy muscular fibres in the place of diseased tissues, else I should indulge in the hope of restoring the eldest youth, whose general condition has certainly very much improved during the last year, and he is capable of doing more with his hands than he could formerly.

The following are the indications which I have kept constantly in view:

1st. To improve the quality of the blood, by giving it those elements in which it appears to be deficient and diminishing, those on which the deposit of the morbid matter depends. It may be, and most probably is, impossible to re-establish that nice adaptation of the blood to the formation of healthy tissues when once destroyed, for the very reason that the same principle of assimilation is at work in the reproduction of diseased tissues as is in operation in health in the reproduction and preservation of healthy tissues; but, as it is the character of a true philosopher to hope all things not impossible, and believe all things not

unreasonable, so is it the character of the physician to hope and believe that the term *vis medicatrix naturæ* does not represent a nonentity; and that there is in the animal body, when in a state of disease, a tendency to return to its healthy state, and that he has means and appliances to assist this curative process. Thus the condition of atrophy is known to be coincident with a deficiency of red corpuscles of the blood, and that iron has the property of restoring them. The poor, unhealthy blood, moreover, is deficient in plastic and organisable fibrin, hence a diet, consisting chiefly of the fibrinous elements, would appear to be the most appropriate; whilst such habits of life as are conducive to perfect health, are most likely to improve the function of nutrition, and so meet this first indication.

2dly. To ensure a regular supply of blood for the constant and regular regeneration of the muscular tissue. To this end nothing is more essential than an active capillary circulation in the interstices of the muscular fibres, and nothing more assists such function than muscular action, however well regulated; exercise of all the muscles is of paramount importance, and when the disease is far advanced, artificial exercise should be substituted.

3dly. To preserve a healthy influence of the nervous system, the regulator (as Volkmann has shown) of muscular movements. Those electric currents which, according to Matteucci, are altogether independent of the nervous system, but produced by the molecular interchanges in the muscles themselves, exert a healthy influence on the nervous system by maintaining its function; and when disease has disabled the muscular fibre nothing appears to excite it artificially so much as electricity, the interrupted current seeming to produce more beneficial results than the continued.

The 4th condition, which Mr. Paget has enunciated as necessary to healthy nutrition, namely, "a natural state of the parts to be nourished," so entirely presupposes the fulfilment of the other three, that if they are accomplished it must necessarily be so too.

# Degeneration of the Voluntary Muscles

Fig 1.



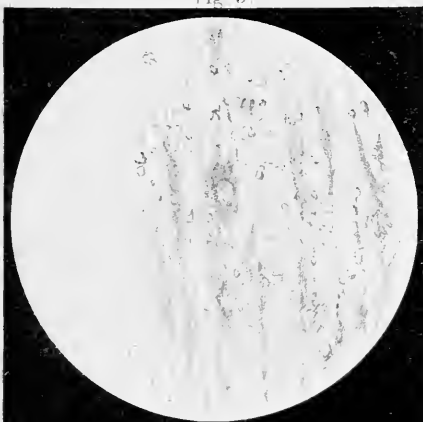
Diseased Muscles, the transverse striæ appearing faintly in places.  
Drawn from the preparation.

Fig 2.



Diseased Muscle from the upper extremities, the transverse striæ beginning to disappear and granules taking their place.

Fig 3.



Diseased Muscle from the lower extremities, the transverse striæ having disappeared

Fig 4.



Diseased Muscle from the lower extremities, shewing little more than granular matter.



CASE OF  
STRICTURE OF THE COLON,  
SUCCESSFULLY TREATED BY OPERATION,  
WITH  
AN ANALYSIS OF FORTY-FOUR CASES OF ARTIFICIAL ANUS.

BY  
CÆSAR H. HAWKINS,  
SURGEON TO ST. GEORGE'S HOSPITAL, AND PRESIDENT OF  
THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

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Received Jan. 2d.—Read Feb. 24th, 1852.

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ON July 21st, 1851, I was asked to meet Dr. Seymour and Mr. Malton in consultation on the case of a lady, aged 44, who, although naturally delicate, had been long free from any illness, except that she had twice experienced, in the preceding year, an attack of pain in the abdomen, which had each time passed off in a day or two, under the use of a gentle aperient; the usual condition of her bowels being that of moderate but constant relaxation, which had not been less marked before the present illness than in the earlier part of her life.

It appeared that on the present occasion, the bowels had not acted since the 15th, six days before my visit; that on the 17th, she had taken some of her usual aperient without effect, but did not feel ill till the 18th, since which time she had twice taken calomel and colocynth, and once some castor oil, and on the preceding day some castor oil and colocynth, and Mr. Malton had also tried enemata, which were not retained. I found her on the 21st with a natural pulse of nearly 80, and without much distress, but suffering from occasional vomiting, with a good deal of distension of

the abdomen, though less than on the preceding day, and with some tenderness, especially in the centre between the umbilicus and pubes, where there was greater resistance and feeling of solidity than elsewhere. I may observe that this part continued, throughout her illness, more tender and less tympanitic than the rest of the abdomen, a circumstance which has been often observed in stricture of the upper part of the rectum, and is therefore of importance as being calculated to lead to error of diagnosis.

I ascertained, on examination, that there was a very capacious rectum, free from any disease as far as the finger could be made to reach, but becoming slightly narrower where it began to turn towards the sigmoid flexure, as if the folds were brought towards each other. The use of a tube or bougie was somewhat difficult, and always required the introduction of the finger, on which it could be directed, not only to lead it correctly into the upper opening among the loose folds of the bowel, but also to throw forwards the uterus, which was retroverted probably from the distended bowels above. Thus directed, the tube or bougie would pass onwards till firmly resisted by the obstruction about ten or eleven inches from the anus, or, allowing for the elongation of the lower part by the pressure, about seven inches from that part. The rectum allowed about three quarters of a pint of injection to enter, but beyond this quantity the liquid always ran out again, and none whatever was ever felt to pass into the bowel above the stricture. Owing to a great degree of lateral distortion of the spine, the space between the ribs and the ilium was too small to allow of the diagnostic sign of bulging of the descending colon; but the other local signs left no doubt in my mind, from the first examination, that there was stricture in the lower part of the sigmoid flexure of the colon.

Daily attempts were made to dilate the stricture by a bougie carefully introduced, and pressed upwards with as much force as I considered prudent; and the bougie was generally followed by a long tube, through which the injection was urged with force till it ran out. At first it seemed

that some little greater distance was gained by these means ; and on several occasions hopes were given by the appearance of a little faecal matter on the end of the bougie, and still more on the 25th, and several succeeding days, by some little pellets or powder of distinctly faecal substance in the enemata. Even this, however, altogether ceased ; and in the thirty days preceding the operation, the whole quantity of faeces which obtained a passage did not exceed two ounces.

On the 22d, a week after the last motion, all medicine was intermitted, and in consequence of this the vomiting wholly ceased till the 29th, when we agreed to give some small quantities of saline purgative, of which, however, only two doses were taken, as a return of sickness and distress, and loss of sleep, and acceleration of pulse, were the immediate result, and the tympanitic state of the abdomen was also obviously increased. After this small doses of opium were alone given, and she again became more comfortable, and took food with appetite ; her pulse fell to about 80, as it had been before the medicine.

On August 5th, Sir Benjamin Brodie met us in consultation ; but as the symptoms were not materially increased, and the relations supposed that an operation would probably not be consented to, nothing was yet said to the patient on the subject.

After this time the pulse became weaker, though seldom accelerated ; a little bilious fluid was now and then thrown up ; she could no longer take much food ; and the distension increased so much as to embarrass her breathing, though still without the least threatening of peritonitis. On the 7th, three grains of calomel with half a grain of opium were given every four or five hours, and continued till the 12th, when the gums becoming slightly affected, the opium was given alone.

During this last week, all traces of faecal substance having long ceased, the end of any instrument, introduced into the stricture, became covered with thick whitish mucus tinged with blood, and the injections brought away some white flocculent substance with mucus, which gave to each of us, as

well as to Sir Benjamin Brodie, who again met us on the 13th, a strong impression, I trust an erroneous one, that it resembled the discharge from a cancerous ulcer.

It now became evident that no further time could be safely allowed for ulceration, or mechanical means, to open the stricture, and therefore the operation was proposed, and readily consented to, for the following day, the thirtieth from the last action of the bowels.

On August 14th, chloroform being administered by Mr. Pollock, I opened the left lumbar colon, Sir Benjamin Brodie, Dr. Seymour, and Mr. Malton giving their assistance. The patient lying a little on her right side, the convexity of the lumbar vertebræ, towards the left side, usual in such cases of lateral distortion, became prominent, and the rotation of the vertebræ accompanying this curve made the transverse processes unnaturally prominent, and consequently the edge of the quadratus lumborum became unusually evident, while the long muscles commonly taken as a guide in the operation were wasted, and turned round out of sight with the spinous processes, towards the right side. It is probable that these alterations of position made the bowel itself approach somewhat nearer to the surface, so as to lessen the difficulty in reaching it, which the unnatural proximity of the ribs to the ilium might otherwise have materially increased beyond what is usual.

A transverse incision, fully three inches long in the usual place, about an inch above the spine of the ilium, readily exposed the bowel, the coats of which, instead of being of the greenish colour sometimes described, were thick and florid, with several large vessels within them. Having passed two ligatures into the coats of the bowel, and fastened them to the integuments above and below, I opened the bowel longitudinally, and consequently at right angles with the incision through the outer parts, for an inch, and slightly divided each lateral margin, upon which a stream of semifluid green feces, having very little faecal matter, escaped, and soon filled a basin, and in the course of the next six hours, at least two quarts had come away, and the abdomen had become com-

paratively soft and flaccid. There was a little trouble from hæmorrhage an hour afterwards, though no bleeding took place during the operation, after which the patient was quiet, though weak, from being unable to take more than a very little fluid nourishment.

During the first three or four days some abdominal pain and tenderness accompanied the continual discharge of fæces, for which opium was required; and on the 16th, two days after the operation, much alarm was excited by a sudden attack of deadly faintness and nausea in the afternoon, followed by frequent vomiting from midnight till three in the morning: this took place for the same period on the two following nights; it required frequent stimulants in small quantities, and probably arose from the action of the bowels.

On the 21st, however, she was able to sit up for a short time, and the appetite became morbidly keen, after which little of importance occurred; her strength was gradually restored, till in about six weeks she became stouter and apparently in better health than before her long illness.

In the first two or three months a small quantity of fæces occasionally passed per anum for a few days, and then ceased; and in the fifth month a little came away in this manner almost every day, sometimes to the extent of a fourth of the daily evacuation, but the stricture remains nearly in the same state, a tube reaching an obstruction, when passed downwards, about three inches from the wound.

The artificial anus has shown the usual tendency to contraction, to obviate which I have had an ivory plug made of the requisite size and length, having found that one of India-rubber was soon destroyed by the liquids of the bowel, and was not sufficiently firm to resist the contraction of the cicatrix. The plug is attached to a small brass plate, which is enclosed in a larger one of India-rubber, which covers the adjacent parts, and is retained in its place by an elastic bandage or by plaster. This plug is generally withdrawn for an hour or an hour and a half in the morning, for the escape of the contents of the bowel, after which it is again introduced for the rest of the day; and with it the lady is

able to ride and walk out, and enter into society without inconvenience. The propulsive effort being probably less than in the natural situation, a gentle aperient is necessary about once in a fortnight, without which there would be more fulness of the abdomen than is consistent with comfort or safety.

POSTSCRIPT. Lady — has continued till the present time (July 14, 1852,) in tolerably good health, the evacuations passing only through the wound. On one occasion so much solid fæces had collected that they required to be broken down mechanically through the wound, in order to check the vomiting and diarrhœa, &c., occasioned by the stoppage.

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It is remarkable that the operation of intentionally forming an artificial anus, in cases of irremediable obstruction of the bowel, was not practised by either of the surgeons who proposed the two chief methods of performing it in 1710 and 1796; and the proposals themselves met with so little favour, that when a modification of Callisen's operation was brought forward by Amussat in 1839 and 1841, in his first two Memoirs, his researches only enabled him to find six instances, three in France and three in England, in which the operation had been resorted to, to which number he added five cases of his own.

In 1844 an able writer in the 'British and Foreign Medical Review,' (vol. xviii,) added seven other operations, making at that time eighteen cases altogether; and in 1847 Mr. Phillips, in his excellent Paper on Intestinal Obstructions generally, enumerated seventeen cases of artificial anus, including some only of the two former tables, but adding two cases before unpublished.<sup>1</sup>

<sup>1</sup> Mr. Phillips indeed ('Med.-Chir. Trans.,' vol. xxxi, p. 29,) enumerates nineteen cases; but in one of them the small intestine was opened "apparently unwittingly," and in the other the patient accidentally drove a stake into his abdomen and injured the bowel. (Related with Case 3.)

Scarcely any year has passed, however, since Amussat's first paper was published, in which the operation has not been performed, especially, I believe, by English surgeons; and four patients are now living, and in good health, in this metropolis, whose lives have doubtless been prolonged by the operation.

It appeared to me, therefore, probable that several important circumstances connected with the operation, hitherto uncertain, might be illustrated by the Tables, which I formed with some labour,<sup>1</sup> of Forty-four cases of the operation, of eight of which, including my own case, the particulars have not yet been published, and in seven of them have been very kindly furnished me by the operators themselves.<sup>2</sup>

<sup>1</sup> The difficulty is greatly increased by the false references and erroneous statements made by preceding writers, which are so numerous and so frequently repeated by others who follow them, that I can scarcely hope my own Tables are altogether free from error regarding the published cases.

<sup>2</sup> Four unpublished cases are added, in an appendix to the Second Table, but are not included in the results. Cases 17, 23, 36, and 40, were read at the 'Med. and Chir. Society,' Feb. 10, 1852, just before the author's Paper was read, the details being published in the present volume.

TABLE I.

*Cases in which the Peritonæum was Opened.*

No. of Case in 1st Table	Name of Operator, with references to descriptions of cases.	Date of Operation.	Age and Sex.	Disease for which the Operation was performed.	Part of Intestine opened, and mode of Operation.	Result.	Cause of Death, or state of patient after Operation.
1	1 M. Pillore. Case given by his son, in Amussat's 1st Memoir, p. 85; L'Experience, Jan. 30, 1810; Gazette Médicale, June, 1840.	1776	M. Adult.	Cancer of rectum, 8 or 9 inches in extent; constipation above a month.	Cæcum in right iliac region; oblique incision above Poutart's ligament.	Died, 28 days.	Obstruction in a fold of jejunum, from 2lbs. of mercury previously given, a month before the operation,—the bad symptoms beginning nearly 20 days after the operation.
2	2 M. Fine. Odier's Manuel de Méd., ed. 2, 1811 (?) p. 275. quoted in Amussat's 1st Memoir, p. 108, from Annales de la Société de Méd. de Montpellier, t. vi. Read by Dr. Duguesseau, at l'Académie de Médecine; Med. Times, vol. x, 1844, p.	1797, Oct. 12	F. 70, Amussat, p. 109; 63 in British and Foreign Med. Review, 1844, vol. xviii, p. 462.	Cancer of rectum.	Transverse colon, by incision in linea alba, between umbilicus and pubes. M. F. intended to have opened the small intestine.	Recovered. Died Feb. 1, 3½ months.	Dropsy. Very little feces passed per anum after operation.
3	3 M. Duguesseau. Read by Dr. Duguesseau, at l'Académie de Médecine; Med. Times, vol. x, 1844, p.	1811	M. Adult.	For the cure of fistule in ano, no obstruction being present.	Colon in left iliac region; by Littre's operation.	Recovered.	The artificial anus closed in two years, and then reopened spontaneously, but finally closed in two years more, the fistula being also cured.

446; Malgaigne's Journal de Chir., t. ii, p. 252; Bulletin de la Société de Chirurgie, t. ix, p. 1082.	1817	M. 47	Stricture of rectum.	Colon in left iliac region; Littre's operation.	Died, 8 days.	No post-mortem. Evacuations incomplete by wound; much liquid, like putrid blood, per anum, seven days after the operation.
4 Mr. Freer. London Medical and Physical Journal, vol. xlv, p. 9.						No feces per anum. Apoplectic seizure four months after operation, but recovered from it to a great extent.
5 Mr. Pring. Ibid., p. 1.	1820	F. 64	Stricture of rectum; 12 days' entire constipation.	Colon in left iliac region; Littre's operation.	Recovered. Alive six months afterwards.	No feces per anum. Apoplectic seizure four months after operation, but recovered from it to a great extent.
6 Mr. Mortland. Edinb. Med. and Surgical Journal, vol. xxiv, p. 271.	1824	M. 44	Stricture of rectum; 25 days' constipation.	Colon in left iliac region.	Recovered. Living 17 years after.	Fæces occasionally per anum in first two years, but probably none afterwards.
7 M. Reybard. Bulletin de l'Académie de Médecine, t. ix, p. 1031, report by Blandin, Berard, & Jobert; Phillips, in Med.-Chir. Trans., vol. xxxi, p. 25.	1833, April 8	M. 28	Cancer of sigmoid flexure of colon.	Three inches of left colon cut out, and the ends sewn together; in left iliac fossa.	Recovered. Died 12 months, March 16, 1834.	Fæces per anum on 10th day; healed in 38 days. Tumour returned in six months in same place, and finally caused death.
8 M. Velpeau. Verbal account at the Academy, in Gaz. Médicale, 1839,	1839, Sept.	F. Aged	Stricture of rectum.	Colon in left iliac fossa. M. Velpeau, it is said, probably tried to open the	Died, 2 days.	Peritonitis, begun before operation.

No. of Case in 1st Table. No. of Case in both Tables.	Name of Operator, with references to descrip- tions of cases.	Date of Opera- tion.	Age and Sex.	Disease for which the Operation was per- formed.	Part of Intestine opened, and mode of Operation.	Result.	Cause of Death, or state of patient after Operation.
9 9	p. 638, quoted in Amussat's 1st Mémoire, p. 161. M. Amussat. 2d Mémoire, p. 43.	1840, May 8.	F. 47	Stricture at the junction of the transverse and ascending colon, with bone lodged in it; seat of obstruction un- known at time of operation; 33 days' constipation. Cancer of rectum.	bowel without wounding the peri- tonæum, but com- pleted the operation on Littre's plan. Cæcum.	Died, 24 hours.	Peritonitis.
10 10	M. Thierry. L'Ex- perience, Oct. 6, 1842, p. 209.	1840	M. 6		Ascending colon, close to cæcum. M. Thierry intended to open the cæcum without wounding the peritonæum; but the colon, distended with mercury, came in the way, dislodg- ed by the weight. Ileum; incision 3 in. long in right side of abdomen.	Died, 22 hours.	Peritonitis.
11 11	M. Monod. Archiv. Gén. de Méd., 3 <sup>me</sup> série, t. ii,	1838, June 5.	F. 25	Stricture of cæcum, only admitting a catheter; un-		Died within 2 days.	

p. 455, 1838; Phillips, Med.-Chir. Trans., vol. iii, p. 26.	12	12	Mr. Luke, Phillips, Med.-Chir. Trans., vol. xxxi, p. 27.	1847	M. 41	Structure of colon, 8 inches from anus, 5 inches long; completely impervious.	Colon in left iliac fossa.	Died within 24 hours.	Peritonitis. Six inches of serous coat of transverse colon ruptured from distension.
	13	13	Mr. Simon (with Dr. Todd). Phillips, Med.-Chir. Trans., vol. xxxi, p. 28.	1847	M. 26	Ileum strangulated by band between mesentery and meso-colon; supposed before operation that the ascending colon was obstructed.	Ileum.	Died, about 12 hours.	Exhausted before operation.
	14	14	Mr. Avery. Pathol. Society, 3d Report, p. 62.	1849	F. 56	Stricture of sigmoid flexure of colon, non-malignant, 14 inches from anus, an inch long, only admitting catheter; supposed to be obstruction of small intestine.	Cæcum opened; incision 6 inches long in right groin. Intestines traced till the stricture was felt in the pelvis; left untouched.	Died, 12 hours.	Collapse, with lymph from peritonitis, though not inflamed at the time of operation.

No. of Case in 1st Table.	No. of Case in both Tables	Name of Operator, with references to descrip- tions of cases.	Date of Opera- tion.	Age and Sex.	Disease for which the Operation was per- formed.	Part of Intestine opened, and mode of Operation.	Result.	Cause of Death, or state of patient after Operation.
15	15	Mr. Avery. 4th Report of Patho- logical Society, p. 222.	1850	M. 55	Obstruction of as- cending colon below the arch, by unnatural twist of colon and cæcum.	1st. Descending colon, external to perito- neum; only scybala found. 2d. Peritoneum opened in same wound, and another artificial anus established in ascending colon.	Died, 28 hours.	Internal coat of bowel ul- cerated and nearly perfo- rated.
16	16	Mr. Lake. Med- Chir. Trans., vol. xxxiv, p. 263.	1850, Dec. 23	M. 60	Stricture of sigmoid flexure of colon.	Colon in left iliac fossa.	Recovered. Seen by myself, in good health, Dec., 1851, and continues so, Feb., 1852. [Conti- nues in good health June, 1852, 18 mo.]	Fæces partly passed per anum four days after the opera- tion, and scarcely any now pass through the artificial anus, though it is freely open, having a flat truss to prevent prolapsus.
17	17	Mr. Adams. Un- published; details communicated by operator, pub- lished in this vo- lume, p. 59.	1851, July 21	F. 35	Tumour in upper part of rectum, believed to be malignant. [Found, post- mortem, to be hard scirrhus.]	Sigmoid flexure of colon in left iliac fossa.	Recovered, 7 months. In good health Feb. 10, 1852. [Died July 13, 1852. For several months gra- dually failing, the tumour being more painful, and consti- pation returned, with difficulty in making water.]	No fæces have passed per anum, only bloody mucus, which is diminishing. [The opening, up to June, 1852, gave no trouble, and readily allowed the escape of fæces when not obstructed above the opening. The bladder was pushed into the right iliac fossa, where it formed a considerable tumour, full of urine. Liver studded with scirrhous tubercles.]

TABLE II.  
*Cases Operated on without Injury to the Peritonæum.*

No. of Case in both Tables.	No. of Case in 2d Table.	Name of Operator, with references to descriptions of cases.	Date of Operation.	Age and Sex.	Ascertained or supposed Cause of Obstruction.	Situation of the Artificial Anus, and mode of incision.	Result.	Cause of Death, or state of patient after Operation.
18	1	M. Amussat. 1st Memoir, p. 34, read Oct. 1, 1839, at the Académie Royale de Méd.; 2d Memoir, p. 32; discussion in Gaz. Médicale, 1839, pp. 585—630.	June 2, 1839	F. 48	Cancer of rectum; constipation 26 days.	Descending colon; by transverse incision.	Recovered. Died 5 months afterwards.	No evacuations per anum. Cause of death, peritonitis from cancer.
19	2	M. Amussat. 1st Memoir, p. 52; 2d ditto, p. 41.	July 14, 1839	M. 62	Cancer of rectum; constipation 8 days.	Descending colon; by transverse incision.	Recovered. Alive about 2½ years, Feb., 1842. Med. Gaz., vol. xxx, p. 15; Gaz. des Hôp., 1842.	The cancer had not made much progress in February 1842, and faeces sometimes passed per anum, after injection.
20	3	M. Amussat. 2d Memoir, p. 2.	July 3, 1841	F. 50	Cause of obstruction unknown; constipation 40 days.	Right ascending colon; by transverse incision.	Recovered. Seen by Dr. Parrott alive and in good health 8 months after the operation. Med. Gaz., vol. xxx, p. 15.	Injections required to produce evacuations by the wound.
21	4	M. Amussat. 2d Memoir, p. 24.	Aug. 1841	F. 60	Cancer of rectum; constipation 45 to 50 days.	Right ascending colon; by transverse incision.	Died, 10 days.	Ulceration of the bowel. No peritonitis. Faeces per anum for two days before death,

No. of Case in 2d Table	No. of Case in both Tables	Name of Operator, with references to descriptions of cases.	Date of Operation.	Age and Sex.	Ascertained or supposed Cause of Obstruction.	Situation of the Artificial Anus, and mode of incision.	Result.	Cause of Death, or state of patient after Operation.
22	5	M. Amussat. M. Vidal, in Gazette des Hôpitaux, March 26, 1842; Gazette Médicale, 1841, p. 588.	Nov. 1841	M. 57	Tumour in left iliac fossa, supposed to be cancer of omentum or sigmoid flexure of colon; constipation 33 days.	Right ascending colon; by transverse incision.	Recovered, 75 days. In Amussat's Memoir. Seen by Dr. Parrott a few weeks after the operation; Med. Gaz., vol. xxx, p. 15.	and the finger could pass through the stricture, which was impracticable before operation. Some faeces per anum. Injections every other day by artificial anus.
23	6	Mr. Clement. Unpublished; communicated by the operator. [See present volume of Transactions, p. 209.]	Oct. 10, 1841	F. 47	Stricture of transverse colon, below which an immense quantity of plum-stones were lodged.	Right ascending colon; by transverse incision (the first so operated on in Great Britain).	Recovered. Lived a little more than 3 years. Plum-stones discharged at various periods from the time of an illness arising from them six weeks after operation.	No faeces; not even flatus per anum, at any time after the operation. Gradual emaciation. Post-mortem examination did not appear to explain the cause of death.
24	7	Mr. Teale. Provincial Medical and Surgical Journal, vol. iii, p. 486.	March, 1842	F. 54	Stricture of sigmoid flexure of colon, 18 inches from anus.	Left descending colon; by transverse incision.	Died, 6 days.	Peritonitis. Cæcum burst, and faeces escaped into the pelvis.
25	8	Mr. Jukes. Ibid., vol. iv, p. 330.	May, 1842	F. 30	Cancerous tumour of rectum, 4 in. long.	Left descending colon; by transverse incision.	Died, 16 days.	Peritonitis. Old chronic adhesions, with some recent lymph, not more near the wound than elsewhere.

26	9	M. Baudens. Lecture by M. B. in Gazette des Hôpitaux, 1842, pp. 249 and 227.	1842	F. 55	Adhesion of rectum to uterus and vagina, after phlegmonous abscess.	Right ascending colon; by <i>oblique</i> incision.	Died, 5 days.	Peritonitis,—begun before the operation.
27	10	Mr. Evans. Med. Chir. Trans., vol. xxviii, p. 95.	1844	M. 23	Stricture at the junction of the ascending and transverse colon; not malignant.	Right ascending colon; by transverse incision.	Recovered. 3 months.	Diabetes and peritonitis, from the further progress of the disease.
28	11	M. Malgaigne. Journal de Chir., t. ii, p. 252; Lancet, 1844, vol. ii, p. 34.	1841	M. 57	Cancer of rectum.	Left descending colon; by transverse incision.	Died, 9 days.	Sudden,—while the bowel was reduced, after protruding from the wound. Death attributed to the cancer.
29	12	M. Amussat. Account by M. Amussat in Gaz. Médicale, 1844, p. 508; Medical Times, vol. x, 1844, p. 401, and vol. xi, 1845, p. 528, for the sequel of the case.	June, 1844	F. 53	Annular stricture of colon, and adhesion to uterus.	Left descending colon; by transverse incision.	Recovered. Nov. 1844, 6 months and 10 days.	From the progress of the disease. Some faeces passed per anum; but latterly the passage was obstructed, and peritonitis took place from this cause.
30	13	M. Baudeloque. Retrospect by Mr. Teale in the Trans. of Prov. Med. As., vol. xiv, p. 119, quoted as from En. des Sciences Med., Feb. 1845.	1845	—	I have been unable to procure the volume of the Encyclopædic to which reference is made; and I suspect the case may be that of	—	—	—

No. of Case in both Tables.	No. of Case in 2d Table.	Name of Operator, with references to descriptions of cases.	Date of Operation.	Age and Sex.	Ascertained or supposed Cause of Obstruction.	Situation of the Artificial Anus, and mode of incision.	Result.	Cause of Death, or state of patient after Operation.
31	14	M. Didot. Gazette Médicale, 1848, p. 235.	1846	M. 65	imperforate rectum in an infant, but I have not thought it right to erase it from the list. Cancer of rectum.	Left descending colon; by transverse incision.	Recovered, living 2 months.	Two months after operation in good health, and at his usual employment (October 29th to end of December), but the cancer making progress.
32	15	Mr. Field. Med. Chir. Trans., vol. xxxiii, p. 45.	1846	M. 33	Stricture of sigmoid flexure, 8 inches up, 4 inches long; blocked up by plug of lymph.	Left descending colon; by transverse incision.	Recovered. Died, 1 year and 9 months.	Feces, by artificial anus; obstructed every two or three months, till the wound was dilated. Ascites: tapped. Chronic peritonitis, and adhesions.
33	16	Mr. Clarkson. Ibid., p. 57.	1846	F. 21	Stricture of upper part of rectum, cartilaginous, 6 inches up; canal obliterated for an inch.	Left descending colon; by transverse incision.	Recovered. Died, 1 year and 2 months.	Obstruction of artificial anus; occasional chronic peritonitis and universal adhesions, with ulceration of bowel,—the most healthy part being some inches above and below the stricture.
34	17	Mr. Crompton. Medical Gazette,	1846	M. 36	Cord-like stricture of colon, 11 in.	Left descending colon; by transverse incision.	Died, 5 hours.	Sudden prostration from peritonitis just before the

35	18	new series, vol. ix, p. 107. Professor Bush, Dec., 1847 Dub. Med. Press, vol. xxiii, p. 230, quoted verbatim from the American Journal of Medical Science, vol. xix, p. 274.	F. 30	from anus and 10 in. from artificial anus. Cancerous stricture of sigmoid flexure of colon.	Left descending colon; by transverse incision.	Died, 14 days; unfavorable symptoms beginning on the 8th day.	operation, of which the patient was scarcely conscious. Peritonitis from the cancer.
36	19	Mr. Clement. Unpublished; communicated by the operator. [See present vol. of Trans., p. 218.] June 21, 1847	M. 43	Cancerous growth entirely filling the rectum, and pressing on the bladder.	Left descending colon; by transverse incision.	Died, 35 days, much relieved.	No post-mortem examination. Morbid growth increased. Sloughing over sacrum, &c. was the chief cause of death.
37	20	M. Maisonneuve. 1847 (?) Bulletin de la Société de Chirurgie, t. i, p. 292. (Read July 18, 1849.)	M. 33	Cancer of rectum.	Left descending colon; by transverse incision.	Recovered. Died, 2 months.	Of phthisis. Rectum quite obliterated by the disease.
38	21	Mr. Hilton. Unpublished; communicated by the operator. Jan., 1849	M. 23	Cancer of upper part of rectum.	Left descending colon; by Callisen's incision, parallel with edge of quadratus.	Died, 17 days.	Worn out by long-continued previous disease.
39	22	Mr. Pennell. Med.-Chir. Trans., vol. xxxiii, p. 255. Nov., 1849	M. 50	Stricture of sigmoid flexure of colon, with stricture of urethra; faces and air passing by bladder and urethra, in which	Left descending colon; by Callisen's perpendicular incision.	Recovered. Living Oct. 1851, as I am informed by Mr. B. Phillips, in better health. [See supplemental note at end of this vol.]	Urine passed per anum, and by the artificial anus, in the first fortnight.

No. of Case in 2d Table.	No. of Case in both Tables.	Name of Operator, with references to descriptions of cases.	Date of Operation.	Age and Sex.	Ascertained or supposed Cause of Obstruction.	Situation of the Artificial Anus, and mode of incision.	Result.	Cause of Death, or state of patient after Operation.
40	23	Mr. A. Baker. Unpublished; communicated by the operator. [See present vol. of Trans., p. 227.]	Jan. 23, 1850	F. 62	pieces of bone, &c. were often caught. Cancerous stricture of rectum, just felt by the finger. [Post-mortem: Narrow dense band, which completely occluded the canal; not examined minutely.]	Left descending colon; by Amussat's transverse incision.	Recovered. Alive Feb. 1852, but the health beginning to fail, with tumour felt in abdomen. [This patient died on the 11th Feb., the day after Mr. Baker's paper was read, and before the present paper has since favoured me with this information.]	Some fecal matter occasionally, per anum, in the first month, but only by the artificial anus since,—always free. [Post-mortem. Cerebriform and colloid cancer of both ovaries. Repeated peritonitis, with adhesions.]
41	24	Mr. Gay. 5th Report of Pathological Soc., p. 108.	1851	F. 52	Adhesion of rectum to scirrhous uterus, obstructing bougie, and adhesion of ileum to uterus, intercepting the passage of feces.	Left descending colon; by Amussat's transverse incision.	Died in less than 12 hours. Only scybala found in colon.	The obstacle to the passage of feces necessarily unrelieved by the operation.
42	25	Mr. Hilton. Unpublished; communicated by the operator.	April, 1851	F. 42	Stricture of left colon, not malignant; constipation 40 days.	Left descending colon; by Callisen's incision parallel with edge of quadratus.	Recovered, 10 months. Alive Feb. 1852, in good health, [and in June, 1852, still in good health.]	No feces per anum since the operation.

43	26 Mr. Paget. Unpublished; communicated by the operator.	July, 1851	F. 67	Annular carcinoma of rectum, about 5 inches from anus; constipation 9 or 11 days.	Left descending colon; by Callisen's vertical incision from the end of the last rib to the crest of the ilium. Died, 36 hours. Great relief for 30 hours, from abundant fecal discharge; then rapid sinking.	Slight peritonitis, especially near the opening into the colon.
44	27 The Author.	Aug. 14 1851	F. 44	Stricture of sigmoid flexure; bougie obstructed about 10 inches from anus; 30 days' complete obstruction.	Left descending colon; Recovered, 6 months. Alive and in good health Feb. 1852. [Well in Aug. 1852, one year after operation.]	Very little feces per anum in the first four months,—a little more in the fifth month,—scarcely any afterwards, except by wound.

## APPENDIX.

No. of Case in 2d Table.	No. of Case in both Tables.	Name of Operator, with references to descriptions of cases.	Date of Operation.	Age and Sex.	Ascertained or supposed Cause of Obstruction.	Situation of the Artificial Anus, and mode of incision.	Result.	Cause of Death, or state of patient after Operation.
45	28	Mr. Teale. Unpublished; communicated by the operator, July 12, 1852.	Feb. 11, 1848	F. 57	Stricture of the lower part of the sigmoid flexure of colon, ascertained by the introduction of the hand into the rectum; obstruction 15 days.	Left descending colon; by transverse incision.	Died in 20 hours, unrelieved by operation.	No post-mortem allowed.
46	29	Dr. Keyworth. Unpublished; communicated by the	May 25, 1848	M. 53	Narrow circular stricture in the middle of the	Right ascending colon; by perpendicular incision, and trans-	Died in 26 hours, much relieved by escape of great	Post-mortem. Several red patches in the intestines, and in three or four places

No. of Case in 2d Table.	Name of Operator, with references to descriptions of cases.	Date of Operation.	Age and Sex.	Ascertained or supposed Cause of Obstruction.	Situation of the Artificial Anus, and mode of incision.	Result.	Cause of Death, or state of patient after Operation.
	operator, July 13, 1852.			descending part of the arch of the colon; no proper evacuation for a month.	verse incision prolonged forward from its centre. The psoas parvus got in the way, and the layers of the meso-colon required separation.	quantity of feces and gas.	the peritoneal coat of the great intestine was ruptured by distension. There was no effusion into the peritoneum.
47	Mr. Phillips. Unpublished; communicated by the operator, April 29, 1852; related also by Mr. Holmsthouse, at the Pathol. Society.	June 20, 1850, in the West-	F. 46	Fibrous tumours of uterus, pressing the rectum against the sacrum, and obstructing the passage of urethral bougie; some softening and ulceration of rectum; constipation 10 days.	Left descending colon; by $\perp$ shaped incision. The small intestine adhered to and discharged into the colon, in the situation of the wound.	Died, 18 days. Relieved at first.	A small quantity of liquid feces passed per anum, and different kinds of matter from the small and great intestine by the wound. Sloughing of wound was the cause of death.
48	Mr. Curling. Unpublished; communicated by the operator.	Feb. 26, 1852, two days after this paper was read.	M. 38	Ulceration of rectum into the bladder (as in 39); water passing per anum and feces per urethram; partial obstruction 9 days.	Left descending colon; by Amussat's transverse incision.	Recovered. No feces at first, but a gallon in 8 hours. Alive 3 months afterwards. [Died July 14, nearly 5 months after the operation.]	Weak and emaciated when he left town, May 28, 1852, (having a pint of slimy purulent discharge daily in March). Some feces per anum eight or ten days before; some feces, on one or two occasions, by urethra, —generally all by wound.

Of these 44 cases of artificial anus, it is known that—

6	died within the first 24 hours,	(9, 12, 13, 14, 34, 41.)
11	„ 48 hours . . .	(8, 10, 11, 15, 43.)
13	„ 1 week . . .	(24, 26.)
17	„ a fortnight . . .	(4, 21, 28, 35.)
19	„ 3 weeks . . .	(25, 38.)
21	„ 5 weeks . . .	(1, 36.)

So that only 23 patients can be considered as having recovered from the operation; but as the operation in one case (3) was performed for the cure of fistulæ in ano, in which, therefore, the dangers of protracted constipation were absent, it will be more fair to state that there were 21 deaths and 22 recoveries.<sup>1</sup> But let us trace the 22 recoveries a little further; first we find that 5 died within six months, viz. :

1	in 2 months . . .	(37.)
1	in 3 months . . .	(27.)
1	in 3½ months . . .	(2.)
1	in 5 months . . .	(18.)
1	in 6 months and 10 days	(29.)

Eight are either alive or are left uncertain under a year, viz. :

1	reported for 2 months, cancer making progress?	(31)—Didot.
1	„ 2½ months, cancer of omentum or colon	(22)—Amussat.
1	„ 6 months. Operation	1820 (5)—Pring.
1	„ 8 months „	1841 (20)—Amussat.
1	„ uncertain „	1845 (30)—Baudelocque.
1	alive at present, 6 months. Operation	Aug. 14, 1851 (44)—Hawkins.
1	„ 7 months „	July 21 „ (17)—Adams.
1	„ 10 months „	April „ (42)—Hilton.

And therefore only 9 survived for about one year or upwards, of whom,—

<sup>1</sup> The deaths and recoveries would be exactly equal if I could include in my Tables a case in which a surgeon in this country wounded the peritonæum, and opened the lumbar colon *below* the seat of obstruction; but my informant does not feel at liberty to communicate to me the name of the operator; nor was there any examination after death, to explain the nature of the obstructing cause.

1 died in rather less than a year	(7)—Reybaud.
1 „ in 14 months . . .	(33)—Clarkson.
1 „ in 21 months . . .	(32)—Field.
1 „ at the end of 3 years . .	(23)—Clement.
1 was alive nearly 3 years, in 1842	(19)—Amussat.
1 is now alive, 14 months . .	(16)—Luke.
2 are now alive, about 2 years	(39)—Pennell, (40)—Baker.
1 lived for 17 years . . .	(6)—Martland.

I must confess that I was not prepared, when I commenced this analysis of all the known cases of this operation, to find that only half the patients survived its performance; still less, perhaps, to ascertain that of those who did recover, so few received more than a brief prolongation of their lives, that only nine lived as much as one year, and that only one patient has hitherto lived beyond three years after the operation; and it became an interesting question to ascertain what were the circumstances which chiefly affected the success of the operation, so as to estimate the chances of life for the six patients who are known to be at this present time alive,<sup>1</sup> and determine how far it is hereafter to be looked on with favour as an established surgical operation.

1. Of 43 patients whose *sex* is recorded, 22 were females and 21 males; and of the 21 early deaths, 11 were females and 10 males; so that neither the frequency of the diseases for which the operation is required, nor the result of the operations, is influenced by the sex.

2. The *age* of 43 patients varied from 21 to 67 or 70, and it was,—

Between 20 and 30 years in 8 cases, of whom 5 died.

„	30	„	40	„	4	„	1	„
„	40	„	50	„	11	„	4	„
„	50	„	60	„	10	„	7	„
„	60	„	70	„	7	„	2	„
reported as adult				in 2		„	1	„
„	aged			„	1 case, which died.			

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<sup>1</sup> Of these six patients, one (40) died February 11th, a few days before my Paper was read, two years and one month after the operation, and another (17) died July 13th, 1852, about one year after the operation.

Exactly half the cases whose age is recorded were, therefore, from 40 to 60 years old.

Of 8 cases, not exceeding 30, 5 died within five weeks, and none lived longer than fourteen months; of 7 cases, above 60 years of age, 5 recovered and only 2 died,—and of the 5 recoveries, 1 is now living, two years since the operation (40),<sup>1</sup> and another was reported as alive nearly three years after the operation (19); so that, at first sight, the advantage seems to be largely in favour of those advanced in life.

But if we examine a little further, we find that of 11 cases from 40 to 50, there were 7 recoveries to 4 deaths; while of the 10 cases from 50 to 60, there were only 3 recoveries, and not less than 7 deaths, in the first few days.

And if we take a further point of comparison, it is found that of 12 cases below 40 years of age, 6 died and 6 recovered; and of 17 cases above 50 years of age, 9 died and 8 recovered.

It would appear, therefore, on the whole, that age exerts less influence than might at first be anticipated, but that at least the age of 60 and upwards is no obstacle to success, since it has, so far, been more successful in the aged than in the young.

3. It might reasonably be expected that the *nature of the disease* for which the artificial anus is made would much affect the success of the operation. These diseases were,—

In 15 cases, stricture of rectum and sigmoid flexure of colon, believed to be not cancerous, (4, 5, 6, 8, 12, 14, 16, 24, 29, 32, 33, 34, 39, 42, 44.)  
 „ 3 „ stricture of ascending or transverse colon, also believed to be non-malignant, (9, 23, 27.)  
 „ 1 case, twist of colon at upper part of ascending colon, (15.)  
 „ 1 „ adhesion of rectum to uterus from inflammation, (26.)  
 „ 1 „ strangulation of ileum by a band, (13.)  
 „ 1 „ fistulæ in ano, (3.)  
 „ 1 „ adhesion of ileum and rectum to cancerous uterus, (41.)  
 „ 17 cases, cancer of rectum and sigmoid flexure of colon, (1, 2, 7, 10, 17, 18, 19, 21, 25, 28, 31, 35, 36, 37, 38, 40, 43.)

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<sup>1</sup> See the previous note of his death.

In 1 case, cancer of sigmoid flexure of colon, or of omentum, (22.)  
 „ 1 „ stricture of cæcum, with scirrhus of its coats from injury, (11.)  
 „ 2 cases, unknown, (20, 30.)

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44

It thus appears that of 42 operations in which the nature of the disease was known, 19 were cancerous, *i. e.*, 45 per cent. Again, of the 21 cases which did not recover from the operation, 10 were cancerous, or above 47 per cent. It follows, therefore, that the operations for cancerous diseases were, to a certain degree, but not much, more fatal in the first five weeks.

We might have anticipated, *à priori*, that few who were operated on for cancer would have lived long after their recovery from the operation; and yet of the nine patients who alone lived for a year, three were cancerous; one of them, Mr. Baker's (40), is yet alive,<sup>1</sup> and another, M. Amussat's (19), was still alive about three years after the operation.

The little influence which cancer thus shows in increasing the mortality, may possibly arise from this circumstance, which I think I have observed, namely, that the more rapidly fatal cases of cancer of the intestinal canal are of the softer kind, in which obstruction is less likely to take place; and that the disease of the inner surface, frequently epithelial cancer, so often seen in the rectum, is less injurious to the general system, than the softer carcinomatous coats of the intestinal canal.

Last month, on January 12th, I met Mr. Chilver in the case of a lady whom I had frequently seen with him during the last three years, believing the disease to be cancerous when I first saw her. For some time before the six days' obstruction, for the relief of which I was now called, numerous abscesses and sinuses had formed, and the whole of the feces had been for some weeks discharged by a large ulceration into the vagina. With some difficulty I broke through the oblite-

<sup>1</sup> See preceding note of his death.

rated anus, and nearly five inches of the rectum, filled with morbid growth, and some portion beyond the reach of the finger, through which I could not force a bougie, gave way four hours afterwards, so as to empty the distended bowel. Notwithstanding this extensive disease, of more than three years' duration, the health of this lady is at present perfectly unaffected, and the bowels have since continued more amenable to medicine than before I employed this violence to the new growths.

It appears, therefore, from the Table that an artificial anus, if required for cancer in the rectum or sigmoid flexure, affords nearly, though not quite, as much chance of immediate, success, and of subsequent prolongation of life, as when performed for all other obstructions not malignant.

It would be highly desirable to separate the diseases of the *rectum* from those of the *sigmoid flexure* of the colon, and to determine the relative frequency of simple stricture, and of cancerous stricture in the latter situation; but the terms upper part of the rectum, and lower part of the sigmoid flexure, are employed indefinitely by different operators for the space of from five to fourteen inches from the anus. Of the whole rectum and sigmoid flexure together, the Tables give the nearly equal number of 17 cancerous and 15 non-malignant obstructions, and 1 case in which Amussat doubted whether a tumour was cancer of the sigmoid flexure or of the omentum. I have heard a strong opinion given by experienced surgeons of the frequency of cancerous stricture in the sigmoid flexure, properly so called; but I venture to state my own opinion as decidedly contrary to this, from what I have seen in post-mortem examinations and in living patients; obstruction of the first five or six inches from the anus have, according to my observation, been most frequently cancerous, or contracted cicatrices of ulcers, but almost all strictures above this height, which could fairly be said to be in the sigmoid flexure, so as to be scarcely, if at all, felt by the finger, have been firm, hard, thickenings of all the coats of the bowel, generally of an annular shape, without evidence of carcinoma, even when more than one

generation has been affected, as I have seen in three instances.

4. Let us next examine the *causes of death*, and the state of those alive at the last report.

A. Of the 21 cases which did not recover from the operation, the *assigned causes of death* were :

In 1 case, 2 lbs. of mercury, given previously, dragging the ileum into the pelvis, (1, cancer—died in 28 days.)

„ 1 „ unrelieved, the obstruction being above the opening, (41, died in 12 hours.)

„ 1 „ faecal evacuations incomplete, (4, died in 8 days.)

„ 5 „ exhausted by the disease, (13, died in 12 hours; 14, died in 12 hours; 43, died in 36 hours—cancer; 28, died in 9 days—cancer; 38, died in 17 days—cancer.)

„ 4 „ structural changes produced by the disease, viz.

a. Cæcum burst, and faeces escaped into pelvis, (24, died in 6 days.)

b. Ulceration of bowel, (15, died in 28 hours; 21, died in 10 days—cancer.)

c. Rupture of 6 inches of peritoneal coat from distension, (12, died in 24 hours.)

In 7 cases, Peritonitis.

a. Old as well as recent, (25, died in 16 days—cancer.)

b. From the operation, (9, died in 24 hours; 10, died in 28 hours.)

c. Begun before the operation, (34, died in 5 hours; 5, died in 2 days; 26, died in 5 days.)

d. From the cancerous ulcer, (35, died in 14 days.)

In 1 case, unknown, but cancerous, (11, died in 2 days.)

„ 1 „ chiefly sloughing of sacrum, (36, died in 35 days.)

B. The deaths of 9 patients, who recovered from the operation, have been recorded; of which—

4 cases were cancerous, (37, died in 2 months of phthisis; 2, died in 3½ months of the disease and dropsy; 18, died in 5 months of the disease; 7, died in 1 year of the disease.)

5 cases were stricture of colon or rectum not cancerous, (27, died in 3 months; 29, died in 6 months; 33, died in 14 months; 32, died in 21 months, all four of the disease; 23, died in three years, probably of the disease.)

c. There are now living, or were alive at last report, 13 cases, of which—

- 4 cases were cancerous, (31, 2 months—cancer making progress; 22, 2½ months—in good health; 40, 2 years—still alive;<sup>1</sup> 19, 3 years nearly—cancer not making much progress.)
- 7 cases were stricture of colon or rectum, not cancerous, (44, 6 months—in good health; 5, 6 months—apoplexy 4 months after operation; 17, 7 months—in good health;<sup>2</sup> 42, 10 months—in good health; 16, 1 year—in good health; 39, 2 years; 6, 17 years.)
- 2 cases, disease unknown, (20, 8 months—in good health; 30, time and state uncertain.

Thus, of 21 cases operated on unsuccessfully, there are only two (9, 10,) in which peritonitis is said to have followed the operation without having been excited by the previous disease, and there is scarcely one in which the death of the patient is directly assigned to the operation; and I am inclined to think that the histories of the cases fairly justify the operators in attributing the fatal result to the previous effects of the disease itself on the constitution of the patients, or to the physical changes in the bowel. Hence we derive a strong argument for as early a performance of the operation, as will be warranted by the immediate danger to life, either from the disease or from the operation, and by a fair estimate of the probable condition of the patient after recovery.

In September, 1850, I met Dr. Todd and Mr. R. J. Pollock, of Kensington, in consultation on the case of a gentleman, 76 years of age, who had suffered from dysentery in a tropical climate, which had probably produced contraction of the colon below the liver. At our second meeting, about the eleventh day of the obstruction, it was agreed that I should offer to open the right lumbar colon, which the patient declined. On the following day, I am informed by Mr. Pollock, acute pain came on suddenly on the right side of the abdomen, while it was being examined by the hand, followed by sudden prostration. There was no examination; but it is most probable that ulceration had taken place with fatal rupture and fecal effusion, and that the refusal of the patient prevented my adding this case to the list of unsuccessful

<sup>1</sup> See preceeding note of his death.

<sup>2</sup> Died July 13, 1852, just a year after the operation.

operations, in consequence of the organic changes of the bowel produced by the disease.

But as the case in which I operated (44) was successful after thirty days' obstruction, and the Tables show similar success even after forty, and from forty-five to fifty days' constipation, (20, 21, 42,) while other patients have died, on whom the operation was performed, as early as the ninth or tenth day, (12, 43,) it is reasonable to infer that the length of time during which the *final* obstruction has existed, is not so much to be taken as a criterion of danger from delay, as the frequency and urgency of *previous* attacks, and the severity of the existing symptoms; a single collection of fæces, as in my own case, being far less likely to produce fatal mischief to the textures of the bowel, than repeated attacks of less complete obstruction.

Yet the surgeon is precluded from operating till as much time has been granted to the efforts of nature, as the symptoms in each case will warrant; because he is met by the fact, that of the 9 patients who recovered, and whose subsequent history is given to us, at least 7, and probably 8, died of the further progress of the complaint for which the operation was performed; 1 having died of phthisis.

Let not any one, however, from this apparently unsatisfactory result of the operation, immediate or remote, infer that it should be abandoned, for the Tables show most clearly that the 22 patients who recovered were saved, for various periods, solely by the operation, since Mr. Luke's case (16) is the only one in which the contents of the bowels have, for the most part, again passed naturally; even in Mr. Martland's case (6), which survived 17 years, no fæces whatever passed per anum after the first two years; in Mr. Clement's case, not even flatus passed per anum during the three years that the patient lived; and, in most cases, some difficulty has been experienced in procuring a free discharge from the artificial anus; and the reason why the further progress of the disease was so soon fatal, when the stricture was not cancerous, is obviously because the artificial anus

was insufficient, dilatation and incision having been required in several of the cases, (e. g. 27, 32, 33.)

5. The next points deserving attention are the *situation* in which the *bowel was opened*, and the *mode* in which the artificial anus was made.

A. *Table of Operations through the Peritonæum. Total 17 cases.*

- In cæcum, 3 cases, (14, died in 12 hours; 9, died in 24 hours; 1, died in 28 days.)  
 „ small intestine, 2 cases, (13, died in 12 hours; 11, died within 2 days.)  
 „ right colon, 1 case, (10, died in 24 hours.)  
 „ transverse colon, 1 case, (2, died in 3½ months.)  
 „ left colon, 9 cases, (12, died in 12 hours; 8, died in 48 hours; 4, died in 8 days; 17, alive now, 7 months; 5, lived above 6 months; 7, died in 1 year; 16, alive now, 13 months; 3, alive above 4 years; 6, lived 17 years.)  
 „ both right and left colon, left external to, and right through the peritonæum, 1 case, (15, died in 28 hours.)

Total, 10 died—7 recovered.

M. Thiery (10) intended to have opened the cæcum behind the peritonæum in the right iliac fossa, but the colon, distended with mercury, came in his way; and in a discussion at the Academy of Medicine it was said that M. Velpeau (8) attempted to open the sigmoid flexure in the left iliac fossa without injuring the peritonæum, but failing to effect this, the operation was completed according to Littre's method. In one case (2) in which the transverse colon was opened, an incision was made between the umbilicus and pubes, with the intention of opening the small intestine. In one case (7) three inches of the sigmoid flexure were actually removed. In another (15) Amussat's operation was first performed on the left side, but the left colon being found empty, the peritonæum was opened, and a second artificial anus established in the right colon through the same wound. In the other cases the usual incision was made in the right or left inguinal regions.

<sup>1</sup> See preceding note of his death.

B. *Table of Operations External to the Peritonæum. Total 27 cases.*

In right colon, 6 cases, (26, died in 5 days; 21, died in 10 days; 22, alive 2½ months; 27, died in 3 months; 20, alive 8 months; 23, died in 3 years.)

„ left colon, 20 cases, (34, died in 5 hours; 41, died in 12 hours; 43, died in 36 hours; 24, died in 6 days; 28, died in 9 days; 35, died in 14 days; 25, died in 16 days; 38, died in 17 days; 36, died in 35 days. *Total* 9, in 5 weeks.—37, died in 2 months; 31, alive 2 months—cancer; 18, died in 5 months; 44, alive now, 6 months; 29, died in 6 months; 42, alive now, 8 months; 33, died in 14 months; 32, died in 21 months; 39, alive now, 2 years; 40;<sup>1</sup> 19, alive nearly 3 years. *Total* 11, lived above 5 weeks.)

Uncertain which side, 1 case, (30, recovered.)

Thus, of both sides there died, within 5 weeks, 11; recovered 16 = 27.

Of right colon, died 2; recovered 4 = 6.

„ left colon „ 9 „ 11 = 20.

In the performance of these lumbar operations the incision was made in 4 instances by Callisen's perpendicular incision on the outer border of the quadratus lumborum, of which 2 died (43, 38), and 2 recovered, (39, 42;) 1, which was fatal, was performed by means of an oblique incision from above downwards and outwards (26); in 21 other cases Amussat's transverse incision was chosen, of which 8 died early;—it is the method which appears to me to be the least likely to lead to difficulty in finding the colon, but the success is not otherwise influenced by the preference.

The two patients in whom the *small intestine* was opened (11, 13,) and three in whom the *cæcum* was opened, (1, 9, 14,) died at an early period;—that in which the *transverse colon* was opened (2) lived for three months and a half. In all six the peritonæum was opened.

Of 17 cases in which the artificial anus was made through the peritonæum, 10 died and 7 recovered from the operation; of 27 operations behind the peritonæum, 11 died within five weeks, and 16 recovered; but this comparison, at first sight favorable to the lumbar operation, contains many sources

<sup>1</sup> See preceding note of his death.

of error; and as the question is one of great importance it requires further examination.

In the first place, of the operations through the peritonæum the fistula case of Duguesseau (3) should be excluded, as being free from the dangers of detained fæces. Both the operations on the small intestine (11, 13,) admit of no operation external to the peritonæum, and should therefore be omitted. Mr. Avery's case of artificial anus in the right colon through a wound in the left lumbar region (15) must be omitted, as too complicated to be again met with; and the artificial anus in the transverse colon (2) must also be left out, as it was made unintentionally, and no surgeon is likely to adopt an operation on this part by choice; but the three cases of operation on the cæcum (1, 9, 14) must be retained in the list, because an abdominal incision on the right side would often oblige the operator to open this portion of the canal, although he might have intended to open the colon a little higher up. Again, of the 27 cases of operation behind the peritonæum, Mr. Gay's (41) must also be omitted at present, though it will require notice in reference to diagnosis, as the real obstruction was found to be in the ileum, and could not, therefore, have been relieved, if its nature had been known, by the lumbar operation.

There then remain only 12 cases of peritoneal section to compare with 26 cases of operation behind this membrane; and it is found that of the former 7 died and 5 recovered, while of the latter only 10 died and 16 recovered; the recoveries being, therefore, as 41 per cent. where the peritonæum is opened, to 61 per cent. where this membrane is uninjured.<sup>1</sup>

The *right* colon and cæcum were opened through the peritonæum in 4 cases, all of which died, (1, 9, 10, 14;) and an artificial anus was made in the *right* colon behind the peritonæum in 6 cases, of which 2 died (21, 26,) and 4 recovered, (20, 22, 23, 27;) and, of the latter, 1 case (Mr. Clement's, 23,)

<sup>1</sup> One of these latter cases (37) died, however, in two months of phthisis; and the time which another (30) survived the period of alleged recovery is not stated in the Tables.

lived for as long a period as three years. As far as these numbers go, the preference on the right side is unquestionably due to the lumbar operation. This operation on the right side, though it happens not to have been performed since 1844, will also fully bear comparison with that on the left colon, as to immediate and ultimate success, although so much higher in the intestinal canal.

The *left colon* has been opened through the peritonæum in 8 cases, (exclusive of the fistula case, 3,) of which there died 3, (4, 8, 12,) and 5 recovered, including Reybaud's case of excision of the diseased part, (5, 6, 7, 16, 17;) and of 20 cases of lumbar operation on the *left colon*, 9 died (24, 25, 28, 34, 35, 36, 38, 41, 43,) and 11 recovered, (18, 19, 29, 31, 32, 33, 37, 39, 40, 42, 44;) the deaths in the abdominal section being  $37\frac{1}{2}$  per cent., and in the lumbar operation 45 per cent.

While, then, a comparison of the whole number of operations, and also of those on the right side alone, is in favour of the operation external to the peritonæum, the comparison of the two methods of procedure on the left side is favorable to the peritoneal section, so far as so small a number, as 8 cases of the one compared with 20 of the other method, can be considered of value. The inequality of the numbers appears to me, however, to leave the question as to the descending colon still undecided; and that each operator, weighing the advantages and disadvantages of an artificial anus in front of the abdomen and of one in the lumbar region, is, as yet, fairly justified in selecting whichever situation he thinks best, on the left side of the body.

My own opinion is that the advantages of the abdominal artificial anus over that in the loins have been sometimes overrated, and the dangers of peritonitis undervalued. The only cases in which the death of the patient is exclusively attributed to peritonitis from the operation, were cases of abdominal section (9 and 10); and in another case of the same operation (14), it is expressly stated that no lymph was found at the time of the operation, but that, although the patient died in twelve hours, some lymph had been formed in

that space of time. When peritonitis has been found after the lumbar operation, it has been remarked (25) that it was not greater near the wound than elsewhere, or else that it had begun before the operation; indeed, in one case, (31,) the collapse from peritonitis already existed to such an extent that the patient was scarcely sensible of the operation, and died in five hours.

Supposing that the danger of the operation was not materially greater in the abdominal section, (which I think it is,) there are two reasons which might make it the most eligible on the left side, though not on the right. The first is the difficulty, and the consequent danger to the patient, which the Tables clearly show, in preserving a free passage through the artificial anus, and which is very probably somewhat greater in the firm texture of the loins, especially in a stout person, than in the softer parietes in front of the abdomen.

I think it not improbable, from my own case, that surgeons may not have sufficiently attended to the very different propulsive power possessed naturally by the rectum, and by any other part of the great intestine, making it almost impossible that actually hard and solid fæces should be expelled through the wound, unless broken down, as I was obliged to do for the lady on whom I operated, on the only occasion, perhaps, in which the evacuation was more solid than a pultaceous mass.

The second reason is that which has been particularly mentioned by Mr. Luke,<sup>1</sup> namely, the power which the surgeon thus obtains of extending his search, if his diagnosis of the seat of obstruction has proved incorrect, a point which next demands attention.

6. *Errors of diagnosis* are the last subject which I will endeavour to follow out from the Tables before us; and they may be of three kinds:—the exact situation of the stricture in the great intestine may be mistaken; or it may be supposed to be in the colon or rectum, when it in reality exists

<sup>1</sup> Med.-Chir. Trans., vol. xxxiv, p. 276.

in the small intestine,—in either case an opening formed below the obstruction necessarily leaves the patient unrelieved; or, thirdly, the presence or supposed existence of a hernia may mislead the surgeon, and induce him to overlook the actual cause of obstruction.

1, *a*. Were it proved that it was difficult to detect the precise situation of an obstruction in the great intestine, it would certainly be right to adopt M. Baudens' rule of always opening the right colon; and the preceding remarks have shown that it may be done with as much success as in a lower part of the bowel, if six cases are considered to determine such a question; certainly, however, it is often quite easy to ascertain the point. In the rectum itself an obstruction is easily felt or seen; nor is it unfrequently so detected in the lower part of the sigmoid flexure.

In September, 1845, I went from town to meet Mr. Thomson of Westerham, in the case of a gentleman, 65 years of age, whose father had died of stricture of the rectum, and who, after increasing constipation for six months, was suffering from obstruction of three weeks' duration; the finger, pushed very high up, could just detect a circular hardness of the bowel, projecting into a healthy and capacious rectum, and having some feces in the centre, of which a small portion continued to come down, though the abdomen was greatly distended with air. Dilatation was attempted; and on his death, a week afterwards, a very narrow circular stricture was found high up in the rectum, just where the finger distinguished it during life.

*b*. In the upper part of the sigmoid flexure, as in my own case, the diagnosis is somewhat more difficult than in the two former situations, from the bougie being occasionally obstructed in its passage through this part of even a healthy bowel; but out of 30 cases in which the left colon was opened, there is only one in which the obstruction was in a higher part of the great bowel than that selected for the operation. In this instance (15) the obstruction was believed, from the appearance of the abdomen, to be situated below the descending colon, but on opening this part in the left loin, it

was found flaccid ; the peritonæum was then opened in the same wound, and a distended bowel, supposed to be the transverse colon, was opened. The patient died twenty-eight hours afterwards ; and Mr. Avery, who operated, found that the ascending colon had been twisted on itself, after being obstructed by the mesentery, so as to turn the right colon and cæcum into the left side of the abdomen, and make the error of diagnosis perfectly excusable. In this case, then, had the wound been made in the right loin, neither colon nor cæcum would have been found, and an abdominal section would have probably been not more successful than this double artificial anus in one wound on the left side.

c. Stricture in the *transverse colon*, or near its junction with the ascending or descending portions, is doubtless the most difficult of diagnosis, but it is sometimes capable of being ascertained with tolerable certainty; sufficient at least to show that the opening must be made on the right side, and not on the left : fortunately it is rare, for the Tables only give three cases of stricture in this part of the bowel, (9,23,27.) I have already mentioned one case in which I offered to open the right colon, but there was no *post-mortem* examination.

In December, 1851, I met Mr. Langley in consultation on the case of a lady, about 70 years of age, in whom an obstruction had existed for nine days. It seemed quite clear to me that this did not arise from a tumour of the uterus, which Mr. Langley had detected, as the finger could readily displace the uterus and pass beyond it ; the tube would pass without difficulty for eighteen inches, and large injections could be borne, and there was no sign of fulness of the left colon, while the whole abdomen was greatly distended. As the vomiting had ceased for some hours, after having been very troublesome for two days, and a good deal of fecal substance was coming away with enemata, there seemed no reason for proposing immediate operation, which was spoken of as possibly necessary on the *right* side, if the stricture did not yield further. I did not see her a second time,

however, and another surgeon, called in by the friends, discountenanced an operation during the thirteen following days, in which I am informed by Mr. Langley she slowly declined, without signs of peritonitis. The stricture was found to be of a simple character, in a part of the transverse colon, without any disease elsewhere, except a fibrous tumour of the uterus, which was quite moveable, so that this was not an unfavorable case for operation, as the patient's health was very good.

Of the cases in the Tables, it appears that Mr. Clement detected a stricture in the transverse colon (23), and Mr. Evans one at the junction of the ascending and transverse colon (27), and therefore both these gentlemen opened the right side of this bowel. In one of M. Amussat's cases (9), the stricture was also situated at the junction of the ascending and transverse colon, but neither the cause nor the situation of the obstruction were detected till after death, and therefore the cæcum was opened by Littre's operation; in a second case (22), M. Amussat could not satisfy himself whether the obstruction arose from a stricture of the sigmoid flexure or from cancer of the omentum; and in a third case (20), the cause was quite unknown to him, and therefore in both cases he opened the right colon; in a fourth case (21), M. Amussat gives no reasons for his operating on the right side, in a case of cancer of the rectum, but as he felt the disease by his finger, there is no ground for supposing that there was an error in his diagnosis, although he seems to have selected the left side in other cases, when he was able to do so. Nor does any error appear in the diagnosis in three other cases, in which the cæcum and right colon were selected for the artificial anus, (1, 10, 26.)

There is, in fact, only one case of operation on the right side in which it is probable that the surgeon would have made an opening in the left colon, if he had formed a more correct diagnosis; and it illustrates the second error of diagnosis to which I intend to draw the attention of the

Society, namely, the difficulty of always distinguishing an obstruction, even in the lower part of the *colon*, from strangulation of the *small intestines*.

2, *a*. In this case (14), Mr. Avery, finding that a tube passed up nearly fourteen inches from the anus; that a pint and a quarter of injections could be retained; and that a large resonant prominence was perceived in the right side of the abdomen, on which side there had formerly been a femoral hernia, and that there had been no previous symptom of stricture, was led to believe that the termination of the ileum was probably strangulated by a band from the hernia. He therefore made an opening six inches long in the right side of the abdomen, and finding, after drawing the small intestines through the wound, that the great bowel was also distended, he proceeded to trace the colon from the distended cæcum down to a firm stricture of the pelvic portion of the sigmoid flexure. An artificial anus was made in the cæcum, but the patient died in twelve hours.

In this case the symptoms depending upon a stricture in the sigmoid flexure of the colon were believed to arise from an obstruction in the ileum. Perhaps regarded critically, after the event, it might be said that the vomiting never being distressing, the rejection of more than a pint and a quarter of the enemata, the tube only passing up nearly fourteen inches, and the great resonance of the swelling on the right side, should rather have led to the opinion that the retained fæces were more likely to be in the left colon, which was softer; but the femoral hernia on the right side naturally drew more attention to the swelling than it deserved.

In my own operation, the entire absence of any previous constipation, the early setting in of vomiting and distension of the whole abdomen, including the small intestines, and the greater tenderness and fulness and feeling of solidity between the umbilicus and pubes, might easily have led to the supposition of the small intestine being the seat of the obstruction; and both cases show the propriety of invariably

examining the rectum and colon in all cases of obstruction.

*b.* In the next cases the opposite error was incurred, and obstruction in the small intestines was believed to be situated in the sigmoid flexure of the colon.

In Dr. Todd's case (13) Mr. Simon, after seven days' illness, made an incision in the right side of the abdomen, in order to form an artificial anus in the right colon, in which an obstruction was supposed to exist; but instead of this the small intestine was found distended and was opened, and after the man's death, a few hours subsequently, it was found that the ileum had been strangulated by a band extending from the mesentery to the mesocolon. Continued attacks of pain in the abdomen, attended with constipation from the boyhood of the patient, not unnaturally led to the idea, other symptoms not contradicting it, that so permanent an obstructing a cause, affecting nutrition so little, was seated in the great intestine.

Mr. Luke has favoured me with the following particulars of a case which was under his care in the London Hospital in December last. On the ninth or tenth day of obstruction, in a man about 40 years of age, he performed Littre's operation in the left inguinal region, but, contrary to his expectation, the sigmoid flexure was found empty, and was therefore not opened, nor was the real cause of obstruction discovered by examination in the wound. The patient died four or five days afterwards, of exhaustion, with little peritonitis, and it was found that a band had strangulated the small intestine as high up as its middle portion.<sup>1</sup>

Mr. Gay, (41,) on the twelfth day of obstruction, performed Amussat's operation in the left lumbar colon, but found that it contained only some hard scybala; the patient died in less than twelve hours, and the fatal obstruction was found to have arisen from adhesion of the ileum, eight inches from its termination, to a cancerous uterus.

<sup>1</sup> This case was described by Mr. Luke in a paper read at the Med. and Chir. Society, Feb. 10, 1852, and is published in the present volume, p. 243.

In all these three cases the symptoms were not sufficiently evident to prevent experienced surgeons from supposing that obstruction actually seated in the small intestines was situated about the sigmoid flexure—not even Mr. Luke, when the strangulated part was situated *four feet* above the cæcum ;—it should, however, be stated that it was almost impossible for Mr. Gay, in the uncertainty which these cases show there may be from want of knowledge of general symptoms, to have suspected the existence of a stricture in the ileum, since the rectum adhered also to the uterus, and was obstructed so as to prevent the introduction of a tube above this part, and probably to have caused a lodgment of the scybala found in the colon between the two obstructed parts, giving him, therefore, all the local signs of obstruction in the rectum, which would naturally conceal those of the higher stricture.<sup>1</sup>

Still, although mistakes may occur, even in the hands of skilful surgeons, it is obvious from the Tables that they are very few in number, and appear to me by no means sufficient, on account of the obscurity of the symptoms, to justify the having recourse invariably to Littre's operation in preference to Amussat's, particularly as Mr. Luke's case, just mentioned, and another presently to be noticed, have shown, that even when opportunity has been afforded by such operation for search within the abdominal cavity, the real cause of obstruction has nevertheless escaped the observation of the operator. There is also, as yet, no known case of recovery after an artificial anus has been intentionally made in the small intestine, except when there has been the protrusion of a hernia, the circumstances of which, and the nature of the operation necessary for it, are essentially different from those of a direct incision into the abdominal

<sup>1</sup> Mr. Southam, of Salford, has obligingly forwarded to me an account of a case of obstruction produced by carcinoma of the duodenum, in which a tumour was formed by solid matter in a distended and displaced *stomach*, which I hope to see published on account of its interest in relation to the subject of diagnosis.

cavity to relieve a known or supposed cause of obstruction of the small intestine.

3. In the third place, as it bears important relation to the subject before the Society, the coincidence of a hernia with stricture of the rectum or colon must not be overlooked, as a source of error in diagnosis. It will be observed that in Mr. Avery's case, before narrated, (14,) the previous existence of a hernia so far influenced his judgment, as to induce him to open the abdomen, without, as it appears, having examined the rectum, in the junction of which with the sigmoid flexure a narrow stricture existed. In the 'Report of the Pathological Society' (the Fourth, p. 218,) is another case of exactly the same kind; in this instance, a man, 50 years of age, on the fifth day of his illness, supposed that a hernia had come down, after an interval of twenty years, and therefore Mr. Luke, thinking there might have been a reduction *en masse*, opened the abdomen at the upper and outer part of the inner ring on the left side, where the fulness had been felt; but the colon distended and hypertrophied above a very narrow stricture, situated twelve inches from the external sphincter, was not felt by the finger in the wound, and consequently the patient died, unrelieved, four days afterwards. As very little inflammation appears to have been present in either case, the formation of an artificial anus might perhaps have prolonged the lives of both patients.

A case resembling these occurred to myself; and although I did discover the stricture, I have since regretted that the operation for artificial anus was not performed. The case was that of a lady, about 45 years of age, a patient of Dr. Cursham, with whom I also met, at different times, in consultation, Drs. Seymour, Watson, and Blundell, and Mr. Stanley. I saw her first on August 8, 1845, on the fourth day of her illness, which presented the usual symptoms of strangulated bowel. She had worn a truss for a supposed femoral hernia on the right side for several years; but what appeared to be a small femoral hernia was now quite flaccid,

and without the least tenderness in the tumour or near it, and she only felt pain in the epigastrium from constant vomiting, with distension of the abdomen, and the tumour itself disappeared under the use of ice in two or three hours after my first visit. As the symptoms continued, however, I examined the rectum, and with difficulty passed beyond an enlarged and depressed fundus uteri, but neither injections nor bougies would go beyond five or six inches, during her illness. Between the 8th and 12th there was again a feeling of something like hernial sac, once or twice as if with bowel in it, though quite flaccid; and lest the symptoms should in any manner depend on this cause, it was thought right by Mr. Stanley, who now saw the patient, as well as by myself, the tumour having, however, again disappeared, that I should cut down on the hernia; but when this was done there seemed to be no trace whatever of any hernia, nor of any opening in the ring through which one was likely to have descended, so that it was clear that the symptoms solely depended on the stricture of the colon. The patient died on the 16th. There was a very tight narrow stricture of the sigmoid flexure, with slight ulcerations within, but no disease of the bowel above, and scarcely any inflammatory vascularity. The uterus was much enlarged, and the rectum, below the stricture, was united by firm adhesion to the back part of the uterus and vagina, so that a bougie was much obstructed from this cause, as it was during life, about six inches from the sphincter. A little fatty tumour and an absorbent gland appeared to have formed the tumour resembling a hernia, which dragged on the peritonæum, so as to form a kind of pouch, disappearing or coming down at intervals.

The opening of the left colon above the obstruction was talked of by Mr. Stanley and myself in consultation, and I much regret that neither of us felt at that time sufficient confidence in the published reports of the operation to propose its performance. I now think it very probable that this lady, as well as a gentleman, whose case I have pre-

viously mentioned, might have had their lives prolonged by the operation; and the former would very probably have consented to its performance, though not the latter, in consequence of the impression made on his mind by his father's death from the same disease.

CASE  
OF  
INVERSION OF THE UTERUS  
AFTER PARTURITION,  
PROVING FATAL IN EIGHTEEN MONTHS,  
WITH A TABULAR STATEMENT OF THE RESULTS OF CASES  
TREATED BY OPERATION.

BY  
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Mrs. A. B—, æt. 25, was confined in the country with her first child on the 23d April, 1850. Up to that date she had enjoyed good health, and had passed through the term of her pregnancy with less than the usual inconvenience. The consequences of her labour, however, were such, that she came to town early in December, and placed herself under the care of Dr. Robert Lee. At this time I saw the patient, and subsequently, in the intervals of his visits, took charge of the case.

Her appearance now was that of intense anæmia in an advanced stage. The face was waxy and sallow; the lips blanched and shrunken; the hands were thin; the nails pale and livid; and the whole frame was emaciated. To these symptoms were added frequent palpitations; loud systolic and venous bruits; headache; throbbing in the temples; swelled ankles; rapid feeble pulse, and occasional distressing fits of hysteria. She stated that since her confinement she had suffered from "bearing down" and profuse hæmorrhage, of which she had had five attacks since the beginning of July, occurring at or about the regular monthly periods. The discharge was sometimes of a watery character, and in the intervals it resembled leucorrhœa. She was nevertheless free from pain in the uterus and

adjacent parts, and experienced no uneasiness in passing water. On the 4th of December Dr. Lee made a digital examination, and detected a tumour projecting through the os uteri into the vagina for upwards of two inches. It was of a somewhat pyramidal shape, and its base, measuring in its transverse diameter about an inch and a half, was embraced, though not constricted, by the os, and seemed to be so intimately connected with it at all points of its circumference, that no neck could be traced. Its surface was perfectly smooth, and its consistence rather softer than that of the common uterine polypus. Some trifling hæmorrhage followed the examination. Dr. Lee expressed his conviction that the case was one of inverted uterus, and advised strict rest in the recumbent posture till after the next catamenial period, then near at hand, with the employment of cold lotions and ice, if necessary, to restrain the hæmorrhage. The result of this examination led to a communication with Dr. Prothero, the lady's medical attendant in the country, who kindly transmitted to me the following particulars of her labour, and the history of the case while under his care:—The labour proceeded well under natural presentation for fourteen hours, when the pains nearly left her. The os uteri being fully dilated and yielding, a dose of ergot was given and repeated in an hour. This had its full effect, and in about two hours the head had descended into the pelvis; but the case now became complicated by a loop of the funis slipping down in advance of it. With the view of saving the life of the child, the forceps, as soon as they could be procured, were applied, but though the delivery was easily effected, it was dead. The placenta was expelled in a few minutes, no traction being necessary, and the uterus contracted well. The funis was of natural length. After the lapse of an hour some hæmorrhage took place, and the patient became very faint; but a medical gentleman then in charge of her stated, that before he left her, all bleeding had ceased, that the uterus was firmly contracted, and that everything was right. She passed a comfortable night, and for the next three days all went on satisfactorily. The

bowels were moved on the third day by medicine; but a few days afterwards Mrs. A. B. stated that the action was attended with much straining and pain, and that she felt as if something had come down with the motion, but that it gave her no great inconvenience. On vaginal examination, it was now discovered that the uterus was inverted, the fundus having descended to within an inch or two of the labia; but no unusual discharge or hæmorrhage had taken place since the day of delivery. An attempt was at once made to reduce it with as much force as was considered justifiable, which unfortunately proved ineffectual; and on the following morning a consultation was held, when perfect rest and the use of astringent lotions were recommended. Up to the 8th of May (after which date an examination was not permitted for upwards of three months,) no alteration had taken place in the condition of the parts; a suspensory bandage was therefore made with a cushion to support the uterus, and in time the patient was able to take gentle carriage exercise.

A slight sanguineous discharge existed up to the 12th July, which, though varying more or less in quantity, did not occur to any alarming extent. On this day very profuse hæmorrhage took place, and produced much exhaustion, but under rest and the astringent lotions it soon subsided. In the middle of September Mrs. A. B. removed to the seaside, and the change was attended with considerable benefit to her general health.

On the 6th December the catamenia appeared, and the discharge continued moderately for some days; but on the evening of the 12th, after a day disturbed by hysterical feelings, a serous fluid was poured out so profusely as to soak through six or seven napkins used together. On the 13th the discharge was less and of deeper colour, and several clots of blood were expelled. The bowels had been relieved by rhubarb and colocynth, but the action exhausted her much. On the 15th she suffered from feverishness and vomiting, though there was no abdominal tenderness, and in the evening had a prolonged fit of hysteria. On the

16th, after taking some blue pill and Epsom salts, a very offensive motion was passed, and during the action of the bowels she completely fainted. On the 17th the case appeared so alarming as to lead to the belief that it would be necessary to apply a ligature around the base of the tumour with the view of dividing it, which, notwithstanding the risk attending such a proceeding, seemed to be the only means of restraining the hæmorrhage and of preserving the patient's life.

On the 18th, Dr. Locock saw her in consultation, and after carefully examining the tumour, fully concurred in the diagnosis previously given. The propriety of the immediate application of a ligature was discussed, but the hazardous nature of the operation being considered, and the hæmorrhage being now restrained by the aid of a sponge soaked in a strong solution of alum, it was resolved to defer it. In the mean time the plan of treatment agreed upon was to surround the tumour with strips of lint dipped in the solution of alum, to support the system with nourishing diet, and to give one of the mineral acids as a tonic.

On the following day there was some improvement, a tranquil night had been passed, the bowels had been moved by Epsom salts, and there was neither faintness nor hæmorrhage. The same treatment was continued till the 26th, when, as there was only a slight mucous discharge, the lint was not as usual replaced. The patient was on the sofa in the drawing room for several hours in the afternoon, and had taken throughout the day more nourishment.

During the frequent examinations which were necessarily resorted to, pressure was made upon the tumour with the hope, if possible, of reinverting the uterus; but it invariably produced such severe cutting pain in the abdomen above the pubes, that a more systematic and longer-continued attempt to effect this was precluded. The tumour itself possessed but little sensibility.

On the 1st of January, 1851, some citrate of iron in small doses was administered, but the stomach rejected it.

From this time up to the 19th, the patient, still strictly

confined to the horizontal posture, gained strength. The appetite improved, and the bowels were freed at intervals by Epsom salts. On this day the catamenial period again commenced; and on the 21st the profuse sero-sanguineous discharge recurred, and with it the rapid, feeble pulse, whizzing sensations in the head, and other distressing symptoms. In the evening, during the action of the bowels, several florid clots of blood were expelled from the vagina. A mixture composed of the infusion of cusparia, tincture of catechu, and laudanum was prescribed. On the 23d, the discharge was still more copious, and in the evening the pulse ran up to 120, with an irritable beat, the patient became hysterical, and vomited some undigested food. The tumour was, therefore, closely enveloped as before with the lint and alum, care being taken, whenever it was removed, to syringe the parts with tepid water, to bring away any clots which, at times, became very offensive. The two succeeding monthly periods, which commenced respectively on the 21st of February and the 29th of March, were attended with precisely the same symptoms, and the same plan of treatment was adopted. During the intervals the patient rallied surprisingly, and, though suffering much at times from flatulence, intestinal pains, constipation, occasional vomiting, and other symptoms of feeble digestive power, upon the whole she gained strength, and was able to take gentle exercise in an easy carriage or an invalid chair.

On the 16th of April she was well enough to be removed to a distance of upwards of a hundred miles into the country; and though I had no opportunity of seeing her again, I received from time to time very distinct reports of her state. The catamenia returned early in May, and continued longer than usual, for I was informed, in a letter dated the 20th, that at times the discharge was still very copious, with a good deal of colour.

The succeeding period which commenced early in July appears to have been attended with a more severe train of symptoms than any she had before experienced. The loss of blood was most profuse for some days, and then subsided,

leaving a very trifling discharge of serous fluid of most offensive odour. This continued for about a week, during which time the stomach rejected everything, and the pain in the head was so intense as almost, it was said, to deprive her of her senses. The state of weakness to which she was now reduced was such that it was thought she would scarcely recover; she did, however, rally, and, to my surprise, in a letter dated October 13th, I received much more cheering reports. It was stated that the patient had been improving in all respects, that the last three catamenial periods had been passed over naturally, without any hæmorrhage or other untoward symptoms, and that sanguine hopes were now entertained by her relatives that she might ultimately be restored to health. The next report, however, showed that these hopes were not to be realised.

The catamenia again commenced on the 2d of November, and progressed favorably, and during the following week she suffered much from constipation and headache. The former was relieved by medicine, yet the latter increased, and on the 8th and 9th became very severe. The night of the 9th was passed quietly, but in the morning Mrs. A. B. was found in a state of unconsciousness, with labouring respiration, and an erysipelatous redness on one side of the head and neck. From this comatose state she never recovered, but sank, and expired on the night of the 10th of November.

The *post-mortem* examination was conducted by Dr. Prothero, but, not having been made until a week after death, the uterus and appendages were the only parts examined.

The uterus was in a state of partial inversion. The fallopian tubes and round ligaments were drawn inwards and downwards with the fundus, which protruded through the os, forming an oblong, rounded tumour, whose length was three quarters of an inch, its transverse diameter one inch and a half, and its circumference, at the widest part, which was close to the os, about four inches and a quarter. The mucous membrane, which covered it, was smooth, and of a deep purple colour. The anterior lip of the os uteri

was thin and narrow, and rested upon the tumour without constricting it, the posterior was flattened and not easily recognised.

Some few fibres of lymph were found between the adjacent surfaces of the peritoneum covering the depressed fundus.

The left ovary was enlarged to the size of a hen's egg, and contained a cyst as large as a walnut, which enclosed a sanguineous fluid. It was found to be quite impossible, with all the force that could be used, the vagina being dragged down at the same time, to reinvert the uterus.

The accompanying drawing by Mr. William Wing, gives a faithful representation of the parts.

*Remarks.*—The foregoing case affords another illustration of the fearful effects resulting from inversion of the uterus after parturition, an accident which perhaps more than any other in the whole range of obstetric practice attaches to itself a peculiar interest. As in many such instances, the patient, in the prime of life, and free from ordinary disease, sank exhausted by profuse periodical hæmorrhage into a premature grave. For a period of eighteen months her naturally healthy constitution bore up against the drain which it had to support, though the imperfect manner in which the functions were performed, consequent on the exsanguine condition of the whole system, gave rise to much suffering and distress.

Such is not an unusual history of the progress and termination of these cases, if the patient survives the dangers which immediately follow the accident; and the fatality which almost invariably ensues, led to the proposal of extirpating that portion of the uterus from which the blood is poured out. This proceeding, though attended with considerable risk, has frequently been performed with success, but as there still exists some difference of opinion on the propriety of resorting to it, the above case, which I watched with great interest and anxiety for several months, is respectfully submitted to the Royal Medical and Chirurgical

Society, with the hope that it may elicit the experience of its Fellows on this important subject.

The question as to the expediency of attempting the separation of the protruding portion of the uterus in these cases is beset with many difficulties, and it is only, perhaps, when the surgeon is actually called upon for his opinion, that they can be fully understood. In Mrs. A. B.'s case it may be imagined that this was seriously entertained; and indeed on one occasion the apparatus requisite for the application of a ligature was at the bedside, and but for the disappearance of the hæmorrhage, would most certainly have been employed. Though a recourse to the operation has often accomplished its desired object, it is productive of very painful symptoms, and not unfrequently of fatal consequences; and though the inverted condition of the womb in most cases leads to the death of the patient, yet some have recovered from its effects, and life has been prolonged in tolerable comfort for a number of years. We may well agree with Velpeau, a bold surgeon and a sagacious observer, who, in commenting on a case of this kind which occurred in his own practice, says — "*Ces circonstances placent le chirurgien dans les perplexités vraiment cruelles.*"

It is not my purpose in the few following remarks to enter into a consideration of the causes or diagnosis of this serious affection; these are distinctly pointed out by authors who have written on the subject, and by none with fuller detail than the late Mr. Crosse, in his valuable treatise; but before speaking more particularly of the operation, it may be interesting to inquire briefly into some points connected with the histories of those cases in which it was not attempted.

In a few cases on record,<sup>1</sup> the uterus from some cause underwent spontaneous reinversion, and in others, the patient was relieved of the source of her danger by sloughing of the tumour resulting from inflammatory action<sup>2</sup> or

<sup>1</sup> Boyer; '*Mal. Chir.*,' vol. x, pp. 515-16. Colombat de l'Isere; '*Diseases of Women*,' trans. by C. D. Meigs, pp. 182-4. Velpeau; '*Clin. Chir.*,' vol. ii, pp. 125-6.

<sup>2</sup> A case of this kind occurred to Rousset, and is quoted by Sabatier in his '*Médecine Opératoire*,' vol. ii, p. 476.

constriction by the os; but these are rare and happy exceptions, and can scarcely be taken into account in estimating the value of the operation.

With regard to the possibility of reducing the inverted organ, it may be admitted on the testimony of the most competent observers, that unless this desirable end can be effected within a few hours after the accident has occurred, there is little or no hope of its being afterwards accomplished. Even with the aid of instruments carefully constructed and perseveringly employed, the attempt failed in a case<sup>1</sup> of two months and a half standing, under the care of Dr. Bouchet, of Lyons. In Mrs. A. B.'s case, the pressure on the tumour gave rise to such pain in the abdomen that it could not be borne. A few instances,<sup>2</sup> however, are recorded in which reduction was effected at later periods, but from their rarity they cannot be considered as affecting the general rule, nor can parallel results be anticipated in other cases.

The duration of life under inversion of the uterus, when it has reached the advanced stage, varies considerably, much necessarily depending upon the original constitution of the patient, and her ability to rally during the intervals of the monthly discharges. During the time of lactation the danger is of course lessened, and if the accident occurs at a

<sup>1</sup> 'Mém. de Méd. et Chir. Pratiques,' &c., by Martin le Jeune, p. 216.

<sup>2</sup> Cases by Lauverjat, Hoin, and Chopart, after twelve, three, and eight days; 'Traité Pratique des Mal. de l'Uterus,' Boivin and Dugés, vol. i, p. 237.—A case by Dr. Smart, after three weeks; 'Amer. Journal of Med. Sciences' for 1835, vol. xvi, p. 81.—A case by Dr. Gazzan, after nine days, under nauseating doses of antimony continued for twenty-four hours; 'American Journal of Medical Sciences,' vol. vii, p. 357, 1844.—A case by Mr. Dickenson, after twenty-seven hours; 'Med. Gazette,' Jan. 1835, p. 551.—A case by Dr. Belcomb, after twelve weeks; 'Med. Gazette,' vol. vii, p. 783.—A case by Dr. Ingleby, after eight days; 'Facts and Cases in Obs. Medicine,' p. 227.—A case by Dr. Hugh Miller, of Bombay, after three months, under chloroform; 'Edin. Monthly Journal,' Dec. 1851.—*Vide* also Churchill on the 'Principal Diseases of Females,' p. 331;—also a case by M. Barrier, surgeon to the Hôtel Dieu at Lyons, of fifteen months' standing, under etherization; 'Gazette Médicale,' No. xvii, April 24, 1852, p. 272.

comparatively late period of life, the tendency to hæmorrhage is diminished by the natural cessation of the catamenia. The latter fact is well illustrated by a case mentioned by Lisfranc,<sup>1</sup> who found this displacement in a woman seventy years of age, to whom, he states, it gave no inconvenience. It was not discovered until after her death, which was caused by pneumonia. She suffered neither from hæmorrhage, leucorrhœa, uterine pains, nor difficulty in walking.

Mr. Crosse<sup>2</sup> gives references to some cases which had been traced to their termination, though many others of which he speaks were lost sight of. It appears that of twelve cases—

1	proved fatal at 8 months.	
3	„	9 „
1	„	12 „
2	„	22 „
1	„	2 years.
1	„	3 „
2	„	4 „
1	„	5 „

To these may be added Dr. West's<sup>3</sup> case, in which the patient survived twenty-nine, and that of Mrs. A. B., who lived eighteen, months. Dr. King<sup>4</sup> also mentions the case of a lady who lived twenty years under this affection, though suffering from pain and frequent hæmorrhages; and Lamotte<sup>5</sup> gives a case in which the inversion had existed for thirty years.

It is worthy of notice that some have been the subjects of this accident in whom it occasioned but little or no distress, of which the following case, related by Boivin and Dugés,<sup>6</sup> affords an interesting example. The patient came under the care of Dubois on the 18th of August, 1825,

<sup>1</sup> Clinique Chirurgicale, vol. iii, p. 350.

<sup>2</sup> Crosse on 'Inversio Uteri,' p. 171, *note*.

<sup>3</sup> Proceedings of Pathological Society of London; Session 5, 1850-1, p. 140.

<sup>4</sup> Glasgow Med. Journal, vol. i, p. 172.

<sup>5</sup> Burns' 'Midwifery,' 1820, p. 501, *note*.

<sup>6</sup> Traité Pratique des Mal. de l'Uterus, &c., vol. i, p. 215.

being the sixth day after her delivery. When first the inversion took place the hæmorrhage was excessive and nearly exhausted her. The bleeding, however, had not recurred, and though completely blanched she now complained only of a sensation of weight in the pelvis, slight pains in the iliac regions, and frequent desire to pass water. The use of the catheter was for a short time required, but as the tumour, which reached to the labia on admission, diminished in size, this became unnecessary. Some whitish discharge was secreted from that portion of the uterus to which the placenta had been attached. On the eighteenth day after labour the patient travelled home by the diligence. On the 22d September, 1830, upwards of five years from the date of the accident, she again sought advice in consequence of the catamenia not having returned, the only appearance of them being a slight discharge of reddish mucus from the vagina occurring every fifteen or twenty days, and lasting but a few hours. The patient had grown fat, and the tumour was still found to exist.

It is unusual, however, to meet with cases of inversion of the uterus in which so few important symptoms are observed. The touching description of the younger Martin<sup>1</sup> indicates with great accuracy the history of the majority of them. "In the rare cases," says he, "where the woman does not perish from hæmorrhage, the inverted uterus lessens in size as it hardens, and becomes extremely painful; the patient falls into a state of marasmus; her powers are gradually exhausted under the uterine discharges, which there are no means of arresting; hysterical spasms disturb the general economy in its functions; the healthy hue of the skin fades, and a slow hectic fever terminates, sooner or later, her deplorable existence." With such a prospect in view, it becomes a matter of great moment in each case to decide whether any operation shall be performed, in order to avert, if possible, the impending calamity. There are few, probably, who do not shrink, unless it should be imperatively demanded, from any active surgical interference with an

<sup>1</sup> Mém. de Méd. et Chirurgie Pratique, p. 226.

organ of such delicate structure as the uterus, containing within it so large a supply of vascular and nervous tissues ; or with a membrane like the peritonæum, so prone under these circumstances to take on fatal inflammatory action. Experience, however, has proved that in these cases a portion or the whole of the uterus may be removed with the result of arresting the hæmorrhage, rallying the failing powers, and restoring the patient to health. On the other hand, it must not be lost sight of, that in some cases, owing to the severity of the symptoms induced by the operation, its completion could not be effected, and in others it has itself been attended with fatal consequences.

The modes which have been adopted for extirpating the bleeding portion of the uterus are simple excision with a bistoury, excision after the application of a ligature, and gradual strangulation by a ligature only.

The first of these plans was resorted to on one occasion by M. Velpeau,<sup>1</sup> and though the subject of it survived all its dangers and ultimately recovered, the jeopardy in which she was placed was so great, that it will doubtless not be often repeated. The patient had suffered from inversion for three years. The tumour was excised, and the finger entered the peritoneal cavity, and felt the intestines. Though but little hæmorrhage occurred, the acute pain, cramps, restlessness, and syncope, which followed and continued for three days, very nearly deprived her of her life. The uterus was removed, with the exception of a small portion of its neck.

The same surgeon afterwards performed the operation of extirpation twice by applying a ligature and then excising the tumour. In both cases it proved fatal. The first was that of Albertine Holbe,<sup>2</sup> of which he gives very full details in his '*Clinique Chirurgicale*.' The ligature was not tied tightly, and some hæmorrhage followed the excision. The patient died in three days, and post-mortem examination revealed traces of peritoneal inflammation and extravasation of six or eight ounces of blood into the pelvic cavity. M. Velpeau

<sup>1</sup> *Clin. Chir.*, vol. ii, p. 441.

<sup>2</sup> *Ibid.*, p. 445.

attributed her death to the excessive loss of blood she had sustained. The other case was that of Josephine Roussin.<sup>1</sup> Two strong threads were passed through the neck of the tumour, for the purpose of restraining any hæmorrhage that might occur, but were not tied. The fundus of the uterus and part of its body were then removed, and the vagina was plugged. The patient died two days afterwards from peritonitis.

The simple application of a ligature around the neck of the tumour in order to destroy its vitality, appears to possess more advantages than the other modes of operating. The constriction may, in the first instance, be moderate, so as to excite sufficient inflammation to unite the adjacent surfaces of the peritonæum lining the inverted organ, without inducing severe pain and nervous symptoms; and if these should arise, the ligature may be loosened, which usually has the effect of arresting them. Whether the constriction can be more gradually applied and more steadily maintained by a flexible wire than by an ordinary silk or thread ligature, is a matter to be decided by practical observation. In four out of his five successful cases, Dr. Johnson<sup>2</sup> used a ligature made of fine well-annealed silver wire and silk twisted together.

The annexed Table of Operations on the Inverted Uterus after Parturition, collected from various sources, records many cases of the successful application of the ligature, and others in which it proved fatal; and though Velpeau,<sup>3</sup> Boivin,<sup>4</sup> Dugès, and others may be right, in supposing that some which have been published as instances of extirpation of the uterus may have been, in reality, but the removal of polypi, those included in it appear to be well authenticated. Cases where the inversion was produced by polypi have, not being strictly connected with the present subject, been purposely

<sup>1</sup> Gazette des Hôpitaux, vol. vi, p. 413; also 'Medical Times,' Sept. 1844, p. 502.

<sup>2</sup> Dublin Med. Journal, vol. xxvii, Dr. Mac Clintock; and Dublin Hospital Reports, vol. iii.

<sup>3</sup> Clin. Chir., vol. ii, p. 423.

<sup>4</sup> Traité Pratique des Mal. de l'Uterus, &c., vol. i, p. 243.

omitted from the Table, which, without any pretensions to be considered a correct statistical account of all cases in which the operation has been performed, brings out a considerable amount of practical information. Among other points of importance, it illustrates the difficulty experienced in diagnosing inversion of the uterus when of long standing. In nine out of the thirty-six cases it contains, the tumour was mistaken for polypus.

The following is a general summary of the Table :

I. Cases treated by Ligature only:			
A. Successful	.	.	21
B. Unsuccessful	.	.	5
Of these 3 died, and 2 recovered without extirpation of the tumour, the severity of the symptoms induced by the ligature having necessitated its removal.			
II. Cases treated by Excision :			
A. Successful	.	.	1
B. Unsuccessful	.	.	1
III. Cases treated by Ligature and Excision :			
A. Successful	.	.	5
B. Unsuccessful	.	.	3
Total			36

Before concluding this Paper, a few words may be said on the treatment pursued in Mrs. A. B.'s case.

The close application of strips of lint soaked in a strong solution of alum around the tumour was found most effective in restraining the hæmorrhage, and gave rise to no irritation. In the intervals of the catamenial periods, every effort was made to improve the general health and strength by light nutritious diet, and gentle exercise in the open air ; and when the discharge appeared, the strictest rest in the recumbent posture was enjoined. But little advantage was to be expected, nor was any derived, from the internal use of astringent or tonic medicines. The enfeebled stomach revolted against them, and it was considered more important to concentrate all its powers on the digestion of aliment which would most readily undergo the processes of absorption and sanguification.

# TABLE OF CASES

OF

## INVERSION OF THE UTERUS AFTER PARTURITION,

TREATED BY OPERATION.

### I.—CASES TREATED BY LIGATURE ONLY.

#### A. *Successful.*

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
1. Harriet Barwick, æt. 39.	Windsor; Med.-Chir. Trans., vol. X, p. 364.	Eighteen months' standing. Much pain followed the application of the ligature. Threatening of peritoneal inflammation, requiring the use of leeches, and considerable constitutional disturbance. The tumour separated, with the exception of its peritoneal lining, on the 12th day. This was divided with scissors; it contained part of the Fallopian tubes and round ligaments.	Recovered.
2. Mrs. Glasscock, æt. 26.	Newnham; Essay on Inversion Uteri, p. 31.	Three months' standing. Ligature applied April 13th, 1837. Much pain produced. It was loosened on the 14th and 15th; on the 17th the canula was removed, and the ligature left loosely on. On the 18th it was again tightened; and this was done daily till the 6th May, when the tumour came away.	Recovered.
3. —	Johnson; unpublished, but referred to by Dr. Mac Clin- tock, in a footnote in Dublin Medical Journal, vol. 27.	More than two years' standing. Ligature came away on the 10th day. Patient suffered from emaciation, cough, œdema of the legs, pain, and profuse vaginal discharges. She recovered from the operation, but died of phthisis nine months afterwards. Ligature made of fine, well-annealed silver wire and silk twisted.	Recovered.
4. An elderly woman.	Johnson; unpublished, but referred to as the preceding case.	Many years' standing. Continued and profuse hæmorrhages. The tumour came away after a considerable time, much softened and decomposed. Ligature the same as in preceding case.	Recovered.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
5. Mrs. M—, æt. 20.	Johnson; Dublin Hospital Reports, vol. 3, p. 479.	Upwards of fourteen months' standing. Supposed at first to be a polypus, and tied as such. So much pain was produced on tightening the ligature, that the error was discovered; it was not, however, loosened, and the tumour came away in three weeks. Violent pain, nausea, vomiting, and threatening of peritonitis were induced. Catamenia returned. Ligature the same as in preceding case.	Recovered.
6. Mrs. B—, æt. 27.	Johnson; Dublin Hospital Reports, vol. 3, p. 483.	Six years' standing. Application of ligature followed by pain and retention of urine. It was removed on the second day; re-applied after an interval of three weeks, and the tumour, which consisted of the fundus of the uterus and part of the Fallopian tubes, came away on the 19th day. Ligature the same as in preceding case.	Recovered.
7. Mary Byrne, æt. 24.	Johnson; published by Dr. Mac Clintock, in Dublin Med. Journal, vol. 27.	Five years' standing. Ligature applied Sept. 18th, 1844. In consequence of vomiting, pain in the back and uterine region, it was loosened in a few hours. The discharge, however, became fetid. The constitutional disturbance so great on the 11th day, that the canula was removed, and the ligature left on loosely. Extirpation completed with a bistoury on the 28th day. Common flexible ligature.	Recovered.
8. Madame R—	Martin (elder), at Lyon, in 1791; quoted by Martin (younger). in his <i>Mémoires de Médecine et Chirurgie</i> , &c., p. 222.	Two years' standing. Pain following the application of the ligature was easily borne, and the nervous symptoms slight. The tumour came away on the 19th day. All hæmorrhage ceased, and, though the catamenia never returned, her health was not affected. Patient was alive 42 years after the operation.	Recovered.
9. A young lady.	Bloxam; Med.-Chir. Review, vol. xxx, p. 169.	Six months' standing. First considered to be a polypus. Ligature applied in July, 1835. The pain was so excessive that it was removed in an hour. The case was then recognised as one	Recovered.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
		of inversion. A ligature of catgut was applied on the 4th August, and not drawn very tightly. Severe pain followed, and recurred whenever it was tightened, which was relieved by opiates. Tumour came away on the 21st August, the 17th day. Catamenia replaced by a sanguineous discharge, occurring monthly.	
10. Sarah Ford, æt. 54.	Chevalier; Merri- man's Synopsis, 1826. Appen- dix, No. 31.	Ligature applied April 12th, 1804, and tightened on the 14th, 20th, 23d, and 26th. Tumour cut off on the 2d May, being quite killed.	Recovered.
11. —	Bouchet (père); Lisfranc, Clin. Chir., vol. 3, p. 400.	Three years' standing. Ligature applied with success.	Recovered.
12. A lady, æt. 32.	Esselman, of Nashville; Western Med. and Surgical Journal, Aug. 1843; detailed also in Amer. Journal of Med. Sciences, 1844, vol. 7, p. 255.	Twelve years' standing. Tumour, the size of a large pear, mistaken for polypus. Application of ligature of saddlers' silk, well waxed, followed by great pain and prostration, the pulse being scarcely perceptible. Tumour came away in 18 days. Catamenia suppressed.	Recovered.
13. —	Blundell; Obste- tric Medicine, p. 807.	Fifteen or sixteen months' standing. Ligature applied with Hunter's needle. Uterus came away, softened, on the 11th day. No bad symptoms.	Recovered.
14. —	Hall; Blundell's Obst. Medicine, p. 808.	Ligature was applied, but the patient being of an irritable constitution, it required to be frequently loosened. Tumour ultimately came away.	Recovered.
15. —	Clarke (Dr. Gran- ville's case); Gooch on Dis- eases of Wo- men, p. 263; also referred to in Lond. Med. and Surgical Journal for 1828.	Upwards of two years' standing. Ligature applied, and tightened every other day; so much pain each time as to require an opiate. Tumour came away on the 14th day. Pain and vomiting occurred throughout the treatment. This patient was seen by Dr. Henry Davies, in 1844, in Belgium, and was then in good health.	Recovered.
16. Mrs. W—, æt. 31.	Crosse; Provin- cial Medical and Surgical	One month's standing. Patient had been the subject of inversion in her first labour, two	Recovered.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
	Journal, vol 8, p. 155.	years before, after the use of ergot of rye and forceps; now the inversion was complete, and the tumour protruded externally. Ligature applied Feb. 12th, 1843, on the neck of the uterus. Pain in the lower part of the abdomen and in the loins followed, which was relieved by opiates. The ligature was gradually tightened, and on the 18th February the tumour was flaccid, dark, and putrefying, and it was cut off below the ligature. On the 20th the ligature was removed. Catamenia suppressed entirely.	
17. A young woman, æt. 19.	Faivre, in the Civil Hospital of Vesoul; Journal de Médecine, for August, 1786, p. 201.	Labour, April 1st, 1767. Midwife dragged upon the placenta and completely inverted the uterus. Tumour the size of a child's head, soon became inflamed and gangrenous. Ligature was applied in a few days, followed by convulsions, and painful draggings in the loins; then followed diarrhœa, and œdema of the lower extremities, which were scarified. Tumour separated on the 17th day. An issue was afterwards made in each leg, to make up for the loss of the natural evacuations.	Recovered.
18. Mrs. A—y.	Gregson; Medical Gazette, 1846, vol. 37, p. 342.	Two years' standing. Profuse hæmorrhage at the monthly periods. The tumour was drawn down with a vassellum, and a strong silk ligature tied with great firmness, with the help of a double canula and an eyed steel staff. Tumour came away in nine days. Reaction from the time of the operation very moderate; an occasional anodyne required, and the catheter was twice used. The entire body and neck of the uterus were removed. Patient up in 20 days.	Recovered.
19. Eliz. Depler, æt. 37.	Weber, of Ham-melburg; Siebold's Journal für Geburtshulfe. &c.	On the 28th November, 1821, patient miscarried. This was followed by hæmorrhage, which, on the 30th, increased to a great degree, and a tumour the	Recovered.

Name and Age of Patient.	Operator, and where reported.	Observations. Symptoms following the Operation, &c.	Result.
	Frankfurt, 1826, p. 406.	size of a man's fist appeared at the vulva. On the 11th December, a fleshy mass, the size of a child's head, came down externally. On the 12th, Weber saw her, and found it to be an inverted uterus. On the 13th, a ligature of waxed shoemakers' twine was placed as high as possible around the tumour, which included a portion of the vagina. This was tightened daily, which gave rise to great pain, numbness of the right thigh, and distress in passing water. On the 18th, the tumour, partly destroyed by sloughing, was cut away. Portions of the Fallopian tubes were found in it. The ligature soon came away. The patient recovered, and had no return of the catamenia; but every four weeks a discharge of whitish mucus occurred for a day or two.	
20. Mrs. M—, æt. 27.	Dr. Henry Davies, who communicated the case.	Confined in April, 1846, of her second child. The placenta was delivered in pieces, but afterwards the parts were apparently <i>in situ</i> . Without any evidence of inversion of the uterus, the patient had hæmorrhage, to a greater or less extent, till the end of August, when Dr. H. Davies first saw her on account of a tumour in the vagina, which was represented to be of recent origin. He found an oviform tumour low down in the vagina, gripped firmly at its base by the os uteri; it was not particularly sensible to the touch. The patient was feeble, and looking exsanguined. A ligature of whip-cord was placed firmly round the base of the tumour (close to the os uteri) with the double canula. The tightening of the ligature caused some pain, which was followed by a fit of hysteria, and syncope of considerable duration. A similar paroxysm, but more violent and	Recovered.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
21. —	Dr. David Davis; the case is quoted, without particulars, in his <i>Obst. Med.</i> , vol. 2, p. 1086. These have been communicated by Dr. John Hall Davis.	<p>longer in duration, always followed the tightening of the ligature, until at length the paroxysms became so alarming that great caution was required, and latterly the ligature, instead of being tightened, was drawn backwards and forwards only. The vagina was daily syringed with tepid water. The canula, with the ligature and tumour, came away on the 21st day after its application. The patient's recovery was retarded by phlebitis of the right leg. She is now (June, 1852,) looking very well and enjoys excellent health, and can take any exercise. A slight sanguineous discharge occurs very regularly at monthly periods from the vagina, which is always preceded by slight headache. The portion of the uterus which was removed by the ligature is preserved. It consists of the fundus and body of the organ, and about an inch of the uterine extremities of the Fallopian tubes and round ligaments on either side, which are seen dipping into the cup-shaped cavity produced by the inversion. The mucous membrane is detached from the surface, so that the inner layer of muscular fibres of the uterus is exposed on the outside of the tumour. Its size is that of a small orange, but more oval, the greatest diameter being placed transversely.</p> <p>In this case the ligature separated in 16 or 17 days. Much constitutional excitement was caused by the operation, but the patient recovered.</p>	Recovered.

*B. Unsuccessful.*

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
22. —	Ramsbotham ; Principles and Practice of Obstetric Med. and Surgery. London, 1841, p. 541, note.	Ten months and a half standing. Ligature applied June 5, 1840. Rigors occurred three or four hours after the operation, followed by symptoms of violent peritoneal inflammation. Distress was so great and danger so urgent, that the ligature was removed 24 hours after its application. Nothing solid passed from the vagina. Health was restored, and catamenia appeared July 13th, without pain or expulsion of coagula, and did so regularly afterwards without hæmorrhage.	Recovered but extirpation was not effected.
23. —	Professor Dubois ; Traité pratique des Maladies de l'Uterus, by Boivin and Dugès, vol. 1, p. 242.	The severity of the symptoms necessitated the removal of the ligature, which was applied in consequence of profuse hæmorrhage.	Recovered, but extirpation was not effected.
24. A woman, æt. 36.	Rey ; occurred in the practice of M. A. Petit, Velpeau's Clin. Chir., vol. 2, p. 423.	Three months' standing. Mistaken for polypus. Ligature was applied, and the patient cried out with pain. It was removed the following day, but she nevertheless sank and died on the fifth day.	Died.
25. A woman, æt. 24.	Traité des Mal. Chir., by Boyer, vol. 10, p. 510, quoted by Velpeau, in his Clin. Chir., vol. 2, p. 437, and by Boivin and Dugès, vol. 1, p. 242.	Mistaken for polypus. The placenta was adherent to the tumour, which hung between the thighs. The young surgeon who mistook the nature of the case, removed the placenta and ligatured the tumour on the day of delivery, July 6th, 1824. This arrested the hæmorrhage, and he then returned the mass into the vagina. On the 24th of July the patient was admitted, under the care of M. Boyer, into La Charité, with the canula in its place and the ligature loose. The tumour came away on the 1st of August ; death on the 12th from peritonitis.	Died.
26. Mrs. S—, æt. 37.	Communicated by J. M. Arnott, Esq.	March, 1849. Disease of 12 months' standing. The vagina occupied by a pediculated tumour the size of a large egg ;	Died.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
		the pedicle that of the forefinger. The disease pronounced to be polypus by three of the first accoucheurs in London, two of them present at the operation. The operator, less certain of its nature, proceeded to the removal of the tumour with caution; having drawn this out of the vagina, the pedicle was exposed and incised layer by layer; immediately on its being ascertained that the case was one of <i>inversio uteri</i> , the knife was laid aside, and a ligature applied tightly above the incision. Peritonitis and death in four days.	

## II.—CASES TREATED BY EXCISION.

A. *Successful.*

27. A lady of Chateauroux' æt. 24.	Velpeau; Clin. Chir., vol. 2, p. 441.	Three years' standing. The tumour was removed with a knife. The finger entered the peritoneal cavity, and felt the intestines distinctly. The operation was followed by acute pains, cramps, extreme restlessness, and faintings, which continued with great intensity for three days. There was but little hæmorrhage. In less than a month the patient was well. The whole body of the uterus was removed; a portion only of the neck being left.	Recovered.
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B. *Unsuccessful.*

28. Josephine Roussin, æ. 35.	Velpeau; Gazette des Hôpitaux, vol. 6, p. 413, 2d series; also Medical Times, Sept., 1844, p. 502.	Fifteen years' standing. Two strong threads first passed through the root of the tumour for the purpose of restraining hæmorrhage, but they were not tied. The uterus was then drawn down, and the fundus and part of its body were removed, and the vagina was plugged. Patient died of peritonitis in two days.	Died.
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## III.—CASES TREATED BY LIGATURE AND EXCISION.

A. *Successful.*

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
29. A young woman, æt. 23.	Lasserre; Archives Générales de Médecine, 2e série, tome 8, p. 395; Velpeau, Clin. Chir., vol. 2, p. 443.	Eighteen months' standing. The ligature was applied, which was followed by repeated and severe pains, each time relieved by laudanum. When tightened the pain was again so violent that it was necessary to loosen it. This occurred several times; at length a fresh ligature was applied around that portion of the tumour not destroyed, and it was removed by the knife. Peritonitis was threatened, and there was swelling of the left leg and thigh. Patient was well in thirty days. Catamenia did not return.	Recovered.
30. A young lady.	Joseph Clarke; Edin. Med. and Sur. Jour. vol. 2, p. 419.	Eleven months' standing. Mistaken for a polypus. A ligature was applied which was followed by great pain, severe vomiting, and watchfulness. Not having produced the desired effect, it was removed at the end of a fortnight. The hæmorrhages, however, ceased, and the health greatly improved. One day, on some effort being made, a large tumour shot suddenly out of the vagina. A ligature was then placed above the indentation produced by the old one, and the tumour was excised below it. Patient was quite well in six weeks. No return of catamenia.	Recovered.
31. Mary Griffiths, æt. 37.	Baxter; communicated to the Med. and Physical Journal. vol. 25, p. 210, by Dr. Merri-man.	Five weeks' standing. Uterus inverted and protruding externally. An armed seton needle was passed through the vagina, and each half of it was included in a ligature. Another ligature was then placed around the whole vagina above this. The vagina was then divided, by which one inch and a half of its length and the whole of the uterus were removed. The lower ligature came away in nine days. The upper one remained on longer. In six weeks the pa-	Recovered.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
		<p>tient was quite well. An appearance of the catamenia on the 24th of October, and once afterwards.</p> <p><i>Note.</i>—Boivin and Dugès doubt the correctness of the diagnosis in this case. No cavity was found in the part removed, nor anything like the ovaries or fallopian tubes, and she imperfectly menstruated afterwards. They consider it to have been a schirrous state of the neck of the uterus, or a polypus. Baxter says the absence of a cavity and other appearances resulted from inflammation.</p>	
32. A young woman.	Alex. Hunter; Duncan's Med. Annals, 1799, vol. 4, p. 366.	<p>One month's standing. Confined Jan. 27, 1795; a tumour discovered shortly after labour in vagina. On the 8th day it was expelled, and the uterus was inverted with it. It was separated from the fundus to which it was attached, but the uterus could not be replaced. A ligature was therefore passed round the neck of the tumour close to the os externum, and it was excised below it. No pain or uneasiness followed. Patient was out of bed in fourteen days, and well in a month. No catamenia afterwards.</p>	Recovered.
33. Elizabeth Field, æt. 41, cook.	Moss; Lancet, vol. 1, 1837, p. 359.	<p>Six years' standing. Quite external and ulcerated. First ligature of Indian twist applied 26th March. Other ligatures afterwards applied at different times of whipcord, catgut, and wire, as the previous ones had not answered the purpose. A circular slough formed, but there was much difficulty in completely destroying the tumour. Violent pain, spasms and vomiting were induced by the ligatures. During the treatment the ligature was withdrawn for a week owing to the severity of the symptoms. On the 16th of Dec. the tumour was excised and profuse hæmorrhage occurred from some arteries, which were tied. Dec.</p>	Recovered.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
		31.—Able to leave her lodgings. Jan. 8.—Superintending the dinner. In three weeks a protrusion of intestine occurred through the broken up cicatrix, but from this she recovered.	

### B. Unsuccessful.

34. Albertine Holbe, æt. 26.	Velpeau; Clin. Chir., vol. 2, p. 445.	Eight months' standing. Ligature applied June 6, 1840, and the tumour excised below it. The latter proceeding was not attended with much pain, and but little blood flowed. Two hours afterwards there was pain of the abdomen, and threatening of syncope. Patient died June 9th. Autopsy revealed six or eight oz. of blood in the lower part of the peritoneal cavity, with some signs of inflammation. The portion included in the ligature had slipped through it. Eighty leeches were applied. M. Velpeau attributed death to the loss of blood, and not to the peritonitis.	Died.
35. —, æt. 26.	Cæsar H. Hawkins, Esq., who communicated the case.	March, 1850. Patient much blanched by constant hæmorrhage. The tumour the size of a large pear, attached by a pedicle one inch and a half in diameter to the posterior half of the os uteri. The os uteri was dilated, and was felt as a thin layer around the anterior half of the tumour. It was supposed to be a polypus. A ligature was applied on the 18th of March, and the operation was followed by pain; but no symptoms of peritonitis. The patient passed a good night, but on the following day sickness and insensibility came on. The latter symptom continued, with only a slight intermission, on the day preceding her death, which took place on the 25th of March. Post-mortem examination revealed injection of the lining membrane of the	Died.

## 152 INVERSION OF THE UTERUS AFTER PARTURITION.

Name and Age of Patient.	Operator, and where reported.	Observations, Symptoms following the Operation, &c.	Result.
36. ———	Unpublished.	<p>ventricles of the brain, softening of their surfaces, and the central portions of both hemispheres, with slight extravasation of blood into the softened substance. The fundus, body, and part of the neck of the uterus were inverted. The portion of the organ below the ligature was gangrenous, and had partly separated.</p> <p>[<i>Note</i>.—The death of this patient does not appear to have been a direct consequence of the operation, inasmuch as neither venous nor diffuse peritoneal inflammation resulted from it.—J. G. F.]</p> <p>Tumour mistaken for polypus. Three or four months' standing. The first application of the ligature gave no pain. Next day, on its being tightened, great pain followed, which was relieved by withdrawing the canula. On the 3d day, the ligature was twisted; and on the 4th the tumour was excised below it, as it was supposed that its vitality was destroyed. This was followed by great loss of vital power, but no vomiting or peritonitis. Death took place in 24 hours, from the shock of this operation.</p> <p>N.B. The particulars of this case were communicated to Mr. Forbes by a friend.</p>	Died.

There is a preparation in the Museum of University College, No. 1436, of which the catalogue affords the following information :—"An uterus, which was removed by the knife, having been obtruded by inversion, the patient surviving the operation. The tumour is laid open, showing the external surface of the uterus within, while the natural internal surface has, from the disease, become the external. Bristles are passed." The tumour is the size of a very large orange. The internal muscular fibres of the uterus are exposed on its exterior, and the bristles are passed through the Fallopian tubes. As no details of the case were obtained, the case is not inserted in the Table.

I take this opportunity of offering my best thanks to those gentlemen who have communicated to me several interesting cases, hitherto unpublished, and have allowed me to add them to this table.

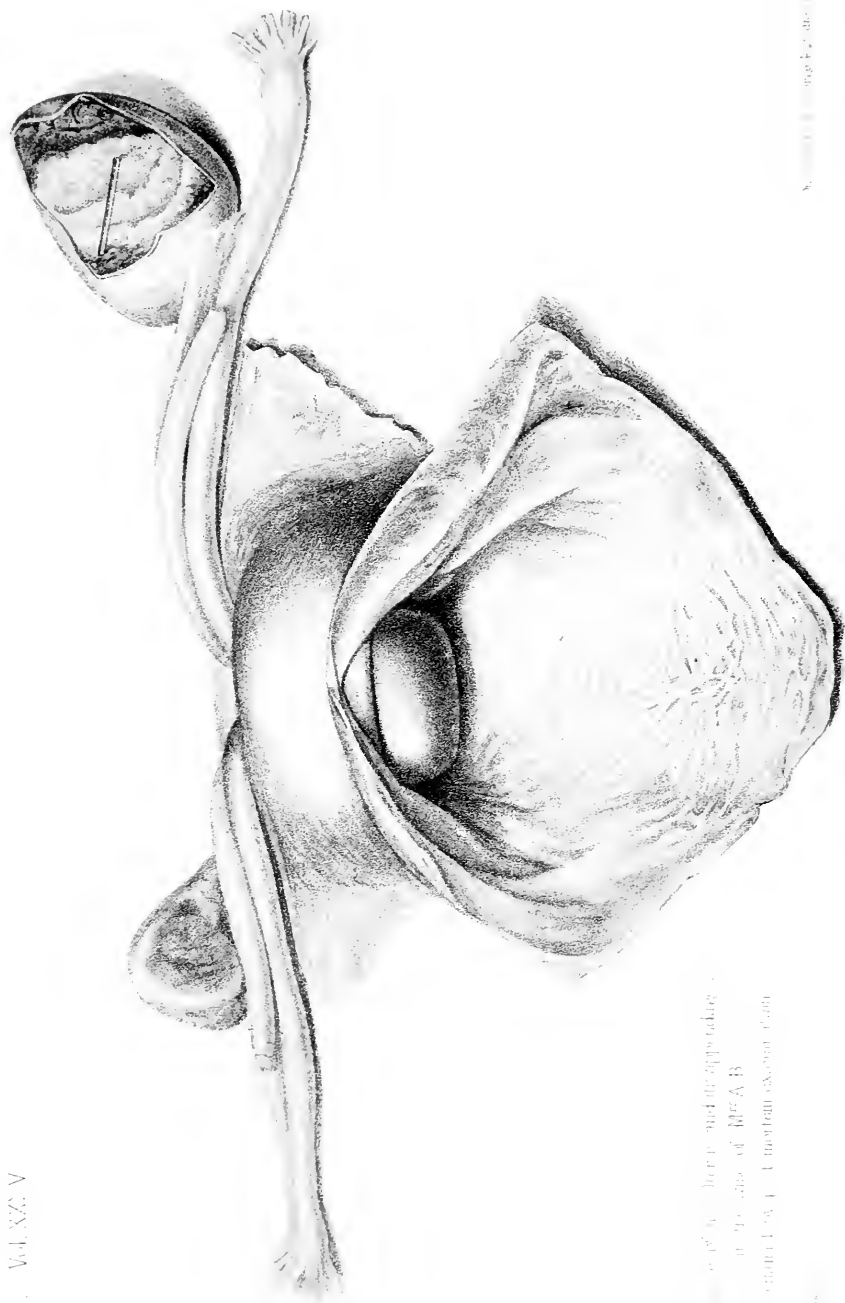
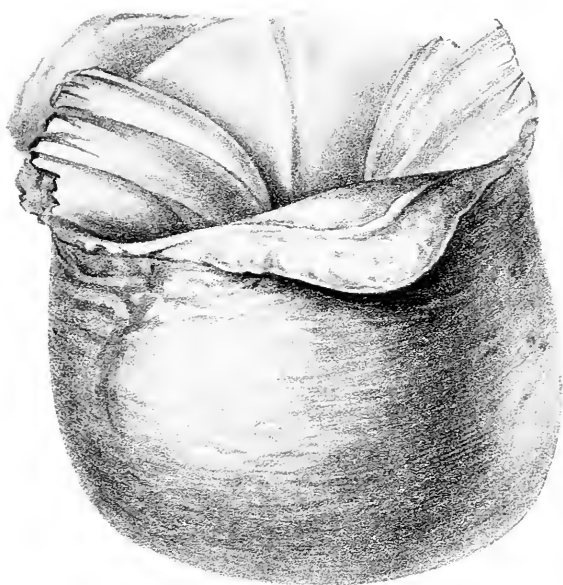


Fig. 1. Dissection of the abdominal cavity  
of a female of *Mr. A. B.*  
of the University of California.





Portals of Infection: Effects of the *Salmonella* Typhimurium Vaccine on the Gut Mucosa of Chickens. The preparation of the *Salmonella* Typhimurium Vaccine, College of Physicians



REMARKS  
ON  
THE SURGICAL OPERATIONS  
USUALLY ADOPTED FOR  
RETENTION OF URINE,

TOGETHER WITH  
AN ABSTRACT OF CASES IN WHICH THE BLADDER WAS PUNCTURED  
THROUGH THE RECTUM FOR THE PURPOSE EITHER OF RELIEVING  
DISTENSION OR OF FACILITATING THE CURE OF IMPERMEABLE  
STRICTURE.

BY  
EDWARD COCK,  
SURGEON TO GUY'S HOSPITAL.

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Received Jan. 13th.—Read April 13th, 1852.

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THERE is, perhaps, no situation in which the surgeon finds himself so much embarrassed, as when called upon to relieve a patient suffering from retention of urine, which has resisted every form of palliative treatment, and where the impermeability of the canal, narrowed by old chronic indurated stricture, and recently closed by inflammation and congestion, defies all attempts to introduce a catheter. There is, perhaps, no disease so unsatisfactory in its treatment as stricture: none in which the remedial measures usually resorted to are so fraught with additional prospective mischief to the patient.

There is no disease in which the progress of instrumental applications, together with a false reliance on manual dexterity and the capability of the urethra to endure violence and laceration with impunity, have led to such disastrous results.

Stricture may well be called the opprobrium of surgery: and although volumes have been written on the subject,

although treatises, pamphlets, monographs, and contributions are daily presented to us in every form and shape, for the purpose of illustrating how much manipulation the urethra will bear with impunity, and how the cure of stricture may be effected with ease, safety, and despatch,—yet hundreds still continue to perish annually from the immediate or remote consequences of the disease; while the shelves of our museums either are, or might be, glutted with preparations, showing the fatal effects of mechanical interference; urethras bruised and lacerated, pierced at all points by the introduction of instruments which have effected a passage in every direction but the right; which have entered everywhere except at the narrow strictured opening through which they were intended to pass.

It is very far from my purpose in this communication to trouble the Society with any remarks on the pathology or the treatment of stricture, or to raise the question as to whether the greater amount of mischief incurred is consequent on the disease or the remedies frequently resorted to for its cure. The few observations I am desirous of submitting to the Society are merely introductory to the cases which form the bulk of the paper; and relate more especially to the treatment of retention accompanied by impermeable urethra, which will yield neither to palliative treatment, nor to any warrantable amount of instrumental surgery in the introduction of sounds, catheters, and bougies. It is such cases which constitute the embarrassing situation in which I commenced by saying, the surgeon is frequently placed.

The most expedient method of relieving a patient under ordinary circumstances from the horrors of retention; or of averting the disastrous and fatal effects of extravasation, when the urethra has given way under continued pressure or the formation of urinary abscess; and, lastly, the safest and most effectual way of curing an obstinate stricture, which has defied all the usual means, and is gradually developing all those constitutional symptoms which indicate vesical disease and renal degeneration, and which slowly,

but surely, terminate in the death of the patient;—the best remedial measures for averting or meeting these three conditions, has long been a vexed practical question amongst surgeons. The symptoms may not be so urgent as to warrant a desperate operation, and delay, with a milder course of practice, is sometimes followed by their subsidence.

But, on the other hand, when in extreme cases all the usual palliative means to relieve retention have been tried in vain; when the stricture continues impermeable to all the manipulations of the surgeon; when extravasation is threatened, or has already commenced; when the increasing distension involves the life of the patient, and the agony of his sufferings renders it imperative to afford him relief; when delay is no longer excusable on the part of the surgeon;—then the resources which he has under his command may, perhaps, be comprised in three modes of treatment, and he has to choose which of them he will adopt in order that the bladder may be reached and the urine withdrawn.

He may take a small but strong catheter, one that will not easily bend, and, firm of purpose, with unflinching hand, and fearless—I had almost said remorseless—heart, he may carry it through all intervening structures and obstacles into the bladder. Again, he may take a knife and cut into the perineum, and endeavour to find and open the urethra behind the stricture and just anterior to the prostate, thus arriving at the bladder by a somewhat more surgical and scientific process than by the first method. Lastly, he may take a trochar and canula and puncture the bladder through the rectum or above the pubes, leaving the urethra and stricture inviolate and untouched.

There is nothing new in either of these measures for relieving retention. I have seen them practised, and have had recourse to all of them myself very many times. They may each possess certain advantages, and the circumstances of the case and the condition in which we may be placed, may incline us to the adoption of either the one or the other. They all have their drawbacks; but, on the whole, I am disposed to believe that the bladder may be reached

with the smallest amount of pain, with the least risk of present or future danger, and with the greatest prospect of ulterior good, by puncture through the rectum.

The first of the three operations I have enumerated is, it must be confessed, somewhat Alexandrine in its character. It may be denominated "forcible catheterism." It is, as it were, puncturing the bladder with a blunt instrument—*tunnelling* through the perineum under cover of the urethra. It is neither scientific in its conception, surgical in its performance, nor anatomical in its details. It can only be countenanced and justified on the principle that the end sanctifies the means. Attempts have been made to modify and soften down its essential roughness by denominating it the operation of forcible dilatation or breaking down of a stricture, and the surgeon, perhaps, tries to delude himself into the idea that his instrument either enters the stricture and forcibly expands it, or else that it breaks it down and destroys it.

To the best of my belief neither of these desirable events ever occurs. The catheter neither expands nor crushes the stricture, but it altogether eludes it, passing outside the obstacle, and then either re-enters the urethra below, or else continues its course through the prostate into the bladder. I have, at different times, had the opportunity of examining (*post-mortem*) the urethras of many persons who had evidently undergone this species of catheterism, and I have never failed to discover the line of road, or, in railway parlance, the loop, where the instrument had left the canal to re-enter it at some point below the stricture.<sup>1</sup>

Nevertheless, the operation of forcible catheterism is one which we are not unfrequently obliged to have recourse to as the only means available to relieve our patient; and when performed resolutely and firmly, with a small, strong instrument adapted for the purpose, it is not necessarily, or indeed usually, followed by the evil consequences which it might be supposed to entail on the sufferer. The great object in view, the evacuation of the bladder, is accomplished,

<sup>1</sup> *Vide* Guy's Hospital Reports, vol. vi, p. 131.

and time is afforded for the employment of means to prevent the recurrence of retention. Still the evil day is merely delayed, as the stricture, the cause of mischief, remains in its original state; and a false passage has been added thereto, presenting a new obstacle to legitimate catheterism. We leave the urethra worse than we found it; the threatened disaster is staved off, but not annihilated; —the snake is scotched, not killed.

The second method for relieving retention and establishing a ready outlet to the contents of the bladder, is one, I believe of long standing and well known to all surgeons. This method consists in opening the urethra between the stricture and the prostate gland. A knife is carried through the perineum in the direction of the membranous portion of the urethra, and, guided by the finger in the rectum, the canal may be reached and opened a little anterior to the prostate. The urine may then be allowed to flow through the artificial passage, or, what is still better, a female catheter may be passed and retained in the bladder. This operation, when performed with dexterity and success, has a great advantage over that of forcible catheterism. The opening thus established may be rendered available for the evacuation of the urine during any length of period that may be necessary; whilst the diseased urethra, relieved from its function as a urinary organ, is no longer irritated by the constant pressure of the contents of the bladder from the one side, or the repeated fruitless attempts to introduce instruments from the other. It may be allowed to repose and recover from the injuries it has sustained. Indeed, were this operation as easy to perform as to describe, it would, probably, long ago have become one of constant occurrence.

Every practical surgeon, however, is fully aware that to open the membranous portion of the urethra, even when the surrounding structures are normal and unaltered by disease, is by no means an easy undertaking; and that the difficulties may be so far increased, by long-standing disease of the perineum, by induration, fistulæ, abscesses, and partial extravasations, as to become insurmountable. Under such

circumstances, I have seen incalculable mischief, and not unfrequently a fatal result, produced by the long-continued yet unavailing attempts of the surgeon to discover the urethra, and accomplish the object for which the operation was undertaken.

A modification, or rather an amplification, of this operation is sometimes practised, or rather attempted to be put in execution. It is called the "cure of stricture by division."

The principle consists in uniting the upper and lower permeable portions of the urethra by the division of the intermediate impermeable portion, and thus restoring the integrity of the canal. The operation is hardly adapted to cases of urgent retention, but has frequently been had recourse to in old chronic strictures accompanied by urinary fistulæ and sinuses, where induration of the perineum and an altered condition of the urethra and its surrounding structures has rendered impracticable the passage of any instrument. The theory upon which this operation is founded I have seldom seen carried out in its execution. The surgeon seldom succeeds in uniting the two pervious portions of the urethra by a clean, fair, and perfect division of the intervening strictured isthmus. In some few instances I have succeeded in carrying out my original intentions; but I look upon these rather as fortunate accidents under favorable circumstances, than as the legitimate results of well-ordered surgery. In several instances I have seen the operation abandoned after much mischief and disorganisation had been inflicted. In others, the surgeon has succeeded, after much time and difficulty, in carrying a catheter into the bladder; but a large majority of the patients so treated have died within the week, unmistakeably from the injuries sustained during the operation. The *post-mortems*, while they revealed false passages, lacerations, and irregular sections in abundance, showed clearly how futile had been the attempt to divide the stricture, or to discover and lay open the patent portion of the urethra behind it.

So convinced am I, by experience and observation, of the difficulty which frequently attends the operation of opening

the urethra behind the stricture where the land-marks which should guide us have been obliterated ; so impressed am I with the danger and fatality which is likely to result from fruitless and protracted efforts to introduce a catheter into the bladder through the perineum, that of late years I have abandoned the practice of incising the perineum with a fixed determination to reach the bladder. I consider it more expedient to be contented with a minor triumph : and in those cases where retention and extravasation render it necessary, that an outlet should be afforded to the contents of the bladder through the perineum, I limit myself to making a free incision down to the region where the urethra may be supposed to be situated ; and thus, after having, to the best of my judgment, laid bare the site of the canal, and attempted, by gentle means, to introduce a catheter through the wound into the bladder, I prefer, if this cannot easily be accomplished, to release the patient from any farther cutting, searching, or manipulation. I have almost invariably found that the urine has readily and speedily found its way through the incision, and that thus the chief object in performing the operation has been realised. At a subsequent period, when the swelling has subsided and the parts have become quiet, an instrument may generally be passed, if it be found necessary, through the wound into the bladder.

I have glanced over these two operations for relieving retention of urine, viz., forcible catheterism and incision through the perineum, for the purpose of showing the unsatisfactory nature of the first, and the difficulty and danger which often attend the latter ; difficulty and danger which, although perhaps not acknowledged, are so far felt, as frequently to restrain surgeons from incurring the risk and responsibility of putting it in practice ; thus inducing a fatal delay by which many lives are sacrificed.

I am anxious to explain the motives which have induced me of late years to adopt puncture of the bladder through the rectum as a means for relieving retention, although it is an operation which at no time appears to have found much

favour, which latterly has nearly fallen into disuse, and is almost universally condemned, in works on surgery, as a desperate remedy, only to be used in desperate cases, dangerous in its execution, and liable to be followed by mischief and misery to the patient.

It is somewhat singular that not one of the disastrous consequences which have been described, has been realised in the considerable number of instances in which I have performed the operation. I will, however, leave the Cases to tell their own story, as my only object in bringing this communication before the Society, is to show how much the operation is worth in surgery, and how far it is legitimately available to relieve a condition which of all others calls for prompt and efficient treatment.

CASE I. George E—, age unknown; admitted into Guy's Hospital February, 1846. He appeared to be in the last stage of renal disease, evidently under the influence of poison from urea, and could give no account of himself, except that he had passed no water for two days.

On examining his organs, the penis was found much mutilated by old disease, which had completely destroyed the glans and obliterated the urethra. An obscure fistulous opening existed in the perineum, through which he had probably passed his water; but this had now ceased to afford an outlet, and the perineum itself indicated incipient extravasation or abscess. His belly was tumid, and the bowels apparently loaded. The bladder could be felt distinctly prominent above the pubes. When I saw him the usual means had already been adopted, but without relief either to his bladder or his bowels. The distension was increasing, and I punctured the bladder through the rectum, and drew off a large quantity of water. It was remarked that when his bladder had been apparently emptied, a certain prominence would still be felt above the pubes; and this remained unaltered until he died, although the urine continued to be freely evacuated through the canula. The operation afforded him immediate relief, and during the short remainder of his

life he suffered no more from retention. His bowels were with great difficulty opened by repeated purgatives and injections. He gradually sank into a comatose state, and died on the night of February 24, six days after his admission.

*Examination.*—The kidneys extensively diseased. The urethra obliterated throughout nearly the whole of its course. A supplementary bladder was found situated somewhat behind and to the left side of the true bladder, with which it communicated by an opening of considerable size. It seemed principally formed of mucous membrane protruded between the muscular vesical fibres, and was in fact an enormously dilated sacculus. The true bladder was empty, but the false one was full of urine, and constituted the permanent prominence just alluded to. It had pushed the real bladder over towards the right side, so that the trochar had entered the cavity of the latter just anterior and to the left of the opening of the left ureter. Not the slightest trace of mischief nor indication of infiltration could be observed around the wound made by the trochar.

CASE II. THOS. P—, æt. 43; admitted into Guy's Hospital April 23, 1847. Dissolute and intemperate. Had suffered eighteen years from stricture, which had resisted all attempts at catheterism. Had several times been in hospitals and elsewhere, but no instrument had ever been passed into his bladder. A few weeks previously had been under my own care for a few days. Had passed no water whatever for twelve hours: great agony and distress. Perineum full and tender. Being acquainted with the previous condition of this man, and knowing the inutility of delay or palliative means, I at once punctured his bladder, and evacuated between two and three pints of dark and offensive urine. I subsequently opened an abscess in the perineum.

April 25.—I withdrew the silver canula and substituted an elastic tube, through which he continued to pass his water until May 3, when I found but little difficulty in introducing a small elastic catheter through the urethra into

his bladder. The canula was then withdrawn from the rectum. There was no further difficulty in the ordinary treatment of this case; and when he left the hospital, five weeks after his admission, he could make water in a full free stream, and was relieved from all his former symptoms. No urine escaped through the puncture after the removal of the canula.

He died of renal disease in May, 1851. On inspection, a faint cicatrix on the mucous surfaces of the bladder and rectum indicated the site of puncture.

CASE III. J. R—, æt. 22; admitted into Guy's Hospital April 28, 1847. Dissolute and intemperate. Has had symptoms of stricture five years, following clap, with occasional attacks of retention requiring the catheter. On his admission he was passing his water with extreme difficulty and distress, and his canal had been much disorganised by previous attempts to pass an instrument. All the usual methods, employed during four days, failed in giving him relief; and on May 2, he having passed no water whatever for twenty-four hours, I punctured the bladder. Three days afterwards an elastic tube was substituted for the silver canula.

May 11.—An abscess was opened in the perineum.

May 14.—The tube was removed, as it had become obstructed, and the water now flowed through the natural passage. He continued to pass *a portion* of his water for some days through the recto-vesical opening, and left the hospital perfectly well May 19, three weeks after his admission.

CASE IV. J. P—, æt. 35; admitted into Guy's Hospital May 21, 1847. A Policeman. Between three or four years ago he sustained much injury from a forcible separation of his thighs, and ever since has suffered from gradually increasing symptoms of stricture. Two years ago had temporary retention; and for several months has passed his water by drops, with great difficulty and straining. On his

admission was suffering intensely from distended bladder, and the fruitless efforts which had been made to introduce an instrument. After much trouble, a small catheter was passed into the bladder and retained until the next day.

May 24.—Total retention, with great distension and distress. The urethra was too much disorganised by previous manipulation to allow of any further attempts at catheterism, and I therefore punctured his bladder. He retained the caula until May 30, when I was enabled to pass a small elastic catheter through the urethra.

June 13.—The urethra readily admits a moderate sized catheter, but the bladder has in great measure lost its contractile power, from habitual over-distension. To remedy this his water was drawn off daily. In a few days his bladder regained its tone, and he left the hospital, perfectly well, June 18. I saw him about a year afterwards, and learnt that he had continued free from all symptoms.

CASE V. J. H—, æt. 39; admitted into Guy's Hospital June 25, 1847. Had suffered from stricture many years. Had retention ten years ago, and was probably much injured by unsuccessful attempts to pass an instrument. On his admission his bladder was by no means distended, but the intolerance was extreme, and he passed his water in drops with great difficulty.

The usual palliative treatment, combined with instrumental means, was adopted and continued for a fortnight, at which period (July 8) he first came under my observation. He was then enduring great agony; and although there was neither distension of the bladder nor actual retention, I judged it advisable to give him relief and supersede any further attempts on his urethra by puncturing through the rectum. The bladder only contained about eight ounces of urine; and although the operation at once relieved the intolerance and distress, he continued to suffer from dull, heavy, severe pain about the perineum and rectum. This, however, in a few days became relieved after a free evacuation of the bowels, and at the same time

the expulsion of a quantity of grumous coagulated blood from the urethra, no doubt the product of previous violence.

July 14.—The canula, which had become coated with calculous matter, and was producing great irritation, was now removed. During the next two weeks, he passed his water principally through the rectum, but also in an improving stream through the urethra; the recto-vesical puncture acting as a safety valve, through which the urine gushed out whenever there was any urethral obstruction, or when he strained forcibly to micturate. I now introduced a small bougie into the bladder, and the case readily yielded to ordinary gentle treatment, until he left the hospital quite well, August 17.

CASE VI. Mr. G—, æt. 29, residing in the neighbourhood of London. I was called to see this gentleman May 31, 1846. A year previously he had received a blow on the perineum, followed by a copious flow of blood from the urethra, since which he had experienced gradually increasing symptoms of stricture. Both before and since he had led an intemperate and dissolute life, and his complaints had been much aggravated by his irregular habits, and also by a course of unsuccessful catheterism to which he had been lately subjected.

He could only void his urine in drops, with great pain and misery. The perineum somewhat swollen, painful, and tender; very weak and irritable. After four days' palliative treatment he was rather worse than better; and I then punctured the bladder, June 4. The operation afforded the most decided relief. At the end of twenty-four hours he accidentally withdrew the canula; but he continued to pass his water without effort and in a good stream through the rectum, and in a few days it began to flow through the natural passage.—July 9: I opened a deep abscess in the perineum, after which his urine passed for a time through all three channels, and he continued to improve, although slowly.—July 28: I introduced a small catheter into the bladder, and larger ones were successively passed until he

was perfectly restored, and I ceased to attend him Aug. 14th. The recto-vesical and perineal openings had perfectly closed. I saw him two years afterwards, and found his urethra had again contracted, but succeeded in passing a small instrument.

CASE VII. James A—, æt. 55; admitted into Guy's Hospital May 12, 1846. Completely broken down by intemperance and excesses, with all the symptoms of advanced disease of bladder, prostate, and kidneys. During the last year had passed his water with extreme difficulty. He had had complete retention for three days previous to his admission. On the first and second day a catheter had been forcibly introduced into his bladder, and on each occasion he lost much blood. Since the second introduction he had passed no water, and repeated attempts to relieve him had failed. He again underwent much manipulation; but when I was called to see him in the evening, I succeeded in passing a small catheter through a disorganised urethra into the bladder.—May 14: I was again called to him, as he had voided little or no water; and as his urethra was now completely broken up, I judged it best to puncture his bladder, and thus afforded him immediate relief by withdrawing a large quantity of bloody urine.—May 22: removed the canula, which had become obstructed; and for the next three weeks he passed his water with ease through the recto-vesical opening. A portion of his urine then began to flow through the natural passage, and a catheter was introduced without difficulty.—June 20: he voided the greater part of his urine by the urethra, but his strength had never rallied, and now rapidly gave way. The left leg became swollen and painful, with inflammation of the veins, and coagulation of their blood. Gangrene supervened, and he died June 27.

*Inspection.*—The liver and bladder extensively diseased. The prostate very large and hard, with a band passing across from side to side, obstructing the entrance to the urethra. The urethra somewhat narrowed below the bulb, but no evidence of decided stricture. The canal had been lacerated

in every direction by instruments, and there were innumerable false passages, one of which led to a sloughy cavity between the prostate and rectum. The cause of retention had no doubt been prostatic, and not urethral. The recto-vesical opening still existed, although no urine had latterly passed by it. It presented a well-defined permanent communication between the bladder and rectum, lined by a continuity of mucous membrane between the two cavities. The vesical opening was exactly in the centre of the space bounded by the ureters and prostate.

CASE VIII. B. T—, æt. 36; admitted into Guy's Hospital April 5, 1848, 3 o'clock, P.M. On the previous night, while assisting at a fire, had fallen astride a door, and ruptured his urethra. A few hours after the accident the perineum and scrotum began to swell, and he was unable to void a drop of urine. Repeated fruitless attempts had been made to pass a catheter, followed by copious hæmorrhage from the urethra. On his admission, extensive extravasation had taken place, producing enormous swelling of the scrotum and penis, and extending over the pubes on to the abdomen. I freely incised the perineum and scrotum, ordered fomentations, opium, &c., and in two hours the swelling had greatly abated. He could, however, pass no water; the bladder was distended, and the distress very great. On examining the urethra, I found it completely disorganised by the injury and the subsequent use of instruments. He stated that he had suffered from stricture for some years. I punctured the bladder, and experienced considerable difficulty, as, owing to the swelling and effusion, I could scarcely reach the prostate with my finger. A large quantity of water was withdrawn with immediate relief, and the next day all the symptoms of extravasation and distress had nearly subsided.

April 15.—The canula was removed, as it irritated him much. During the succeeding nine days he passed his urine partly by the rectum and partly by the perineal incision. An elastic catheter was now introduced into the bladder through the penis, and by this he con-

tinued to pass his water for several days, except when it occasionally became obstructed by mucus, and then the urine escaped readily through the rectum. He now rapidly got well; a flexible catheter was occasionally passed and retained until the recto-vesical and perineal wounds had closed. He left the hospital quite well May 20, six weeks after the accident, and could then micturate in a better stream than he had done for some years.

I have seen him occasionally since. There is a strong disposition for the canal to contract at the seat of injury, and he requires the introduction of a bougie from time to time.

CASE 1X. J. H—, æt. 21; admitted into Guy's Hospital November 7, 1848. Had suffered from stricture from a boy, and dates his complaint from an attack of gonorrhœa contracted at the age of 13. During the last six years had been an inmate of all the hospitals of London; had attended at every surgery and dispensary; had been privately catheterised, and subjected to innumerable manipulations; but no instrument had ever been passed into his bladder. In the meanwhile all his symptoms had been assuming a more and more aggravated character. On his admission he had complete retention, which was relieved by palliative measures; and although these measures were continued during a period of seven weeks, and every means adopted to improve the condition of his urethra, no progress towards a cure was made, and I only succeeded in enabling him to pass his water with great difficulty, and just keeping him on the right side of total retention. I therefore resolved to puncture his bladder, with the hope of rendering his urethra more amenable to the ordinary remedial measures. The difficulty was to procure such an accumulation of urine, as would enable me to introduce a trochar with any degree of safety, for his bladder was permanently contracted, and so irritable as to induce a constant desire to evacuate it. By giving him a large quantity of hot gin and water, I succeeded in retaining about two thirds of a pint of urine, and then punctured the

bladder December 22. He wore the canula for nine days, when it escaped during an attack of diarrhœa.

During the next three months I refrained altogether from active treatment, merely examining the urethra from time to time, but avoiding all violence or unnecessary irritation. The recto-vesical opening acted as a safety valve, and allowed a tolerably free but variable passage to the urine. His general condition became much improved. On March 27 I succeeded in passing a very small silver catheter into his bladder, the first which had ever been introduced, and shortly afterwards replaced it by a flexible one. He now rapidly improved, and left the hospital, April 17, perfectly well, his urethra readily admitting a moderately sized instrument.

I have seen this man occasionally since. His urethra has latterly exhibited a strong disposition to contract; and when he last came under my observation, I had great reason to apprehend that from neglect and imprudence he might be again reduced to the same condition in which I found him.

CASE X. J. B—, æt. 59; admitted into Guy's Hospital October 15, 1848. Had suffered from stricture during eighteen years, and had undergone an extended course of catheterism without any passage being effected. Had passed no water since the previous day, and continual fruitless efforts had been made to introduce a catheter. When I saw him, several hours after his admission, he was in a state of utter prostration; the penis and upper part of the scrotum greatly distended from extravasation, with great pain and tenderness about and above the pubes. The tissues of the penis had evidently become infiltrated with urine, no doubt from laceration caused by the instruments used. The perineum was natural. I managed to introduce a small catheter into his bladder, incised the penis and scrotum, and ordered him stimulants, &c.

October 17.—Swelling diminished; no distension of the bladder; but he passes water with difficulty. Penis gangrenous.

Oct. 18.—Urine again retained, and bladder distended. Punctured the bladder with immediate relief, but the gangrene extended, and the next day, during his delirium, he pulled out the canula. His urine, however, continued to flow through the recto-vesical opening during the remaining three days of his life, and kept the bladder empty. He died October 21.

*Inspection.*—Kidneys diseased; bladder large; muscular coat much thickened; lining membrane patched with inflammatory deposit, containing a small quantity of dark turbid urine. The urethra universally contracted and indurated; coated with lymph, and partially ulcerated; pierced in every direction with false passages; a small, but firm stricture at the bulb. The corpora cavernosa infiltrated with urine, and in a state of advanced gangrene. The trochar had penetrated the bladder just behind the prostate, and a little to the right side of the median line. No infiltration whatever had taken place in the track of the instrument.

It is highly improbable that any treatment could have saved this man's life after his admission into the hospital. Nevertheless, had the operation been immediately performed, instead of delaying it for three days, he undoubtedly would have been placed in a better condition.

CASE XI. B. C—, æt. 34; admitted into Guy's Hospital June 22, 1849. Nine years ago he had been much injured by the fall of a heavy stone on to the lower part of his body, followed by swelling about the pubes, genitals, and perineum, with retention, which existed for two days before a catheter could be passed. For six weeks afterwards his urine required to be drawn off, and was mixed with blood. Had ever since suffered more or less from symptoms of stricture, and during the last few months experienced the greatest difficulty and distress. Four days previous to his admission, retention had become nearly complete, and constant efforts had been made without success to introduce an instrument. His bladder was moderately distended, but the distress was

very great. I punctured the bladder, and experienced some difficulty from a deformity of the pelvis and spine, the bladder and prostate being thrown over to the left side; the latter was also much enlarged. Three days after he contrived to pull out the canula, but continued to pass his water partly by the rectum and partly by the urethra. About four weeks after his admission he left the hospital for the purpose of transacting some important business. At this period he still, during the act of micturition, passed a small portion of his urine through the rectum, but by far the larger part flowed with tolerable freedom through the natural channel. I saw him about a month afterwards, when the recto-vesical puncture had perfectly closed, and he passed his water in a small stream, but with perfect ease. I was subsequently informed that he died two years afterwards of diseased liver, but that he had suffered no particular inconvenience from his urinary organs.

CASE XII. G. B—, æt. 19; admitted into Guy's Hospital August 22, 1849. Four years previously he had fallen astride a bar and ruptured his urethra, followed by retention and extravasation. His perineum had been incised, and for several months he passed his water through the opening. The wound eventually healed, leaving a permanent stricture, and he had since voided his urine in a very fine stream with much difficulty and straining, until his increasing distress and misery led him to seek relief. No instrument had ever been passed into his bladder since the accident. From the appearance of the perineum it would seem that extensive sloughing had taken place after the injury, leaving a hard cicatrix, which represented the normal structures of the part. It was probable that a considerable portion of the urethra had been destroyed, as he stated that when he strained to evacuate his urine, he could feel it finding its way along the left side of the perineum, behind the left testicle, until it reached the penis. During eight weeks following his admission I tried various means to re-establish a passage without the slightest success; and as his misery

and anxiety to be relieved were very great, I determined to cut into the perineum and ascertain whether there might not be some pervious portion of the urethra between the stricture and the prostate, by opening which I might arrive at his bladder and afford him relief. This was done; but after a diligent search I was unable to discover any traces of the urethra, and was obliged to abandon the operation.

Some hours afterwards profuse hæmorrhage took place from the wound, and it was obliged to be plugged with sponge. The next day I found that he had passed no water; retention was complete, and the bladder was becoming distended. His distress was great, and as the bleeding continued, and could only be restrained by keeping up firm pressure with a sponge, I apprehended that extravasation might take place among the tissues around the prostate and neck of the bladder. In this dilemma I judged it expedient to puncture the bladder, which afforded him immediate relief. The canula was removed October 27; and he then passed his water with great satisfaction through the rectum, through the perineum, and through the penis. The recto-vesical opening soon closed, and his urine continued to flow through the wound in the perineum. In the early part of December an elastic catheter found its way through the perineal wound into the bladder, and shortly afterwards I united the upper and lower permeable portions of the urethra by cutting through the intervening obliterated isthmus, and carrying a catheter through the entire canal into the bladder.

The perineum quickly healed, and he left the hospital in January, 1850, with a tolerably serviceable canal, which he was directed to keep in order by occasionally passing a bougie. In March, 1851, I found his urethra had contracted from neglect of using the means enjoined, but it was still permeable, and readily admitted a bougie.

I doubt whether this case affords a very brilliant specimen of surgery, but I have given a faithful account of its details.

CASE XIII. J. C.—, æt. 57; admitted into Guy's Hos-

pital October 18, 1849. A worn-out man, very stout and fat. Suffering from severe chronic bronchitis, and the effects of a debauched and intemperate life. Ten years ago his urethra was injured by a kick from a horse in the perineum. Had ever since suffered from symptoms of stricture, variable, but gradually increasing in severity. Six days previous to his admission retention had become complete, and after various attempts, continued during twenty-four hours, a catheter was carried into his bladder and his water drawn off. He had however daily got worse. Very small quantities of water escaped from time to time, and although frequent attempts were made, no instrument could be introduced. When I saw him, three hours after his admission, he was in a state of utter prostration and in great agony. The bladder, if prominent, was concealed by a load of abdominal fat, and could not be felt. The penis enormously swollen; all the tissues apparently infiltrated with urine; the perineum swollen and boggy.

I incised the perineum freely, laying open a large sloughy urinary cavity. He felt relieved. Opium and stimulants were given, and I hoped that he would pass his water through the wound. The next day (October 19,) I found that no urine had escaped, and the end of a bougie, which I introduced into the urethra, came out through the perineal wound.

The abdomen was swollen and tympanitic. I punctured his bladder as the only means of giving him relief. The great size of his nates, loaded with fat, the retirement and depth of the anus, and the obscurity of the parts within the rectum, rendered the operation very difficult and somewhat hazardous, as I could barely touch the anterior part of the prostate with my finger. I however at length succeeded in carrying the trochar into the bladder, and drew off a large quantity of water. He experienced immediate relief, and subsequently great ease, by being enabled to expel a vast quantity of flatus. During the remainder of his life, which lasted eight days, he continued to void his water through the canula. The dyspnœa and the abdominal tension

continued until he sank under an attack of diarrhœa, October 27.

*Inspection.*—Bronchitis and pneumonia. Kidneys extensively diseased. About two inches of the urethra had sloughed away, leaving an old impermeable stricture behind the destroyed portion of the canal. The trochar had just pierced the posterior part of the prostate, and entered the neck of the bladder, a little to the right of the median line. The puncture did not appear to have produced the slightest mischief or disturbance of the surrounding parts.

CASE XIV. J. B—, æt. 51; admitted into Guy's Hospital, February 28, 1849. Had suffered from stricture during fifteen years. Had experienced frequent attacks of retention, and undergone long courses of catheterism. He was in a most miserable condition, with disorganised, impermeable urethra and chronic abscesses, with fistulous openings in the perineum. He remained under treatment in the hospital for three months, when his bladder was punctured.

The canula was removed at the end of ten days, and a month after the operation he was so far recovered as to be able to leave the hospital. His distressing symptoms had all subsided, and he could pass his water in a very tolerable stream without pain or difficulty.

CASES XV and XVI. These cases both occurred in private, and I have not preserved any memoranda of the particulars; but they in no essential point differ from some of those which I have already related. They were both cases of old standing stricture; and I punctured the bladder for retention, which would yield neither to palliative treatment nor to any reasonable amount of catheterism.

The operations were perfectly successful, and enabled me, subsequently, to restore the urinary functions of my patients to a healthy condition.

CASE XVII. Mr. G. H—, æt. 50, residing in the country, consulted me in March, 1851. He stated that seventeen

years ago he experienced an attack of retention, without having previously suffered from any urinary difficulty, and a catheter was forced into his bladder. He lost a considerable quantity of blood from the operation, and the urethra appears to have been much lacerated. Ever since he had suffered from symptoms of stricture, which had been aggravated by several severe courses of catheterism. When I saw him he could only pass his water in a very small stream, and his distress from intolerance and constant incontinence of urine was very great.

After trying every means to penetrate the stricture without success, I punctured the bladder, April 3, having, for that purpose, succeeded in retaining about two thirds of a pint of urine. He was immediately relieved from his more distressing symptoms, and the canula was allowed to remain for ten days. After its removal he continued to pass the greater part of his urine by the rectum, but also in an improving stream by the urethra. The intolerance had ceased, and he could hold his water for several hours. I was still unable to make any impression on the stricture; but finding himself in a state of comparative ease and comfort, and being anxious to return home, he left London the end of April.

He returned to London in December last, and again placed himself under my care.

He informed me that, during micturition, a considerable portion of his urine still passed through the recto-vesical opening, and his urethra appeared to be much in the same state as when he left London.—January 9, 1852: I succeeded in passing a very small silver catheter into his bladder, which I replaced the next day by a flexible instrument. He is now (January 30) enabled to pass a moderate sized flexible catheter, and the urine has ceased to escape by the rectum; but I have not much expectation that his canal will ever be restored to a perfectly healthy state, and he will probably require a frequent use of the bougie to keep it in tolerable order.

CASE XVIII.—S. L—, æt. 42; admitted into Guy's Hospital, January 16, 1852. Addicted to intemperance and excess. Between three and four years ago, had retention after drinking, and was relieved by catheter. He had previously never experienced any urinary difficulty. The next day the operation was repeated with much difficulty, loss of blood, and injury to the urethra. Six months afterwards he again required surgical relief, and ever since appeared to have laboured under gradually increasing symptoms of confirmed stricture. Nine months ago he underwent a lengthened course of catheterism, but without any benefit. On his admission he had voided his urine in drops only during the previous twenty-four hours, and his bladder was much distended. The urethra was quite impermeable. His condition, however, was not desperate, and he experienced some alleviation from the warm bath, opium, &c. The next day, January 17, as the distension had increased, I punctured his bladder. The canula was retained till January 25, when he began to pass some water by the natural passage; and as the instrument was producing considerable irritation to the coats of the bladder, as evidenced by the copious secretion of mucus, it was removed to his great comfort and satisfaction.

He is now, January 30, suffering from an attack of orchitis, but is otherwise going on well, and continues to void the greater portion of his urine through the recto-vesical opening.

CASE XIX. J. M—, æt. 39; admitted into Guy's Hospital August 13, 1847. His health broken down by a life of intemperance and debauchery. Had experienced increasing symptoms of stricture for four years, and had been occasionally catheterised. On his admission, retention had been nearly complete for five days. The bladder was distended, and the distress great. The perineal portion of the urethra had long been in a swollen indurated condition. With great difficulty I passed a very small catheter, and drew off his water. The next day (August 14) retention was again complete, and I punctured his bladder.

In a few days the canula, which had been introduced somewhat too obliquely through a thickened bladder, had partially withdrawn itself, and the urine no longer flowed through it; but by this time the urethra had again resumed its function, and a small flexible catheter passed readily into the bladder. He continued to micturate with tolerable freedom until his death, which took place, September 3, three weeks after his admission. He sank under an attack of pleuritis and hepatitis, and had become completely jaundiced. Previous to his death, a small but very deep-seated abscess was opened in the perineum. The scrotum and penis had likewise become œdematous.

*Inspection.*—The gall ducts and gall bladder were contracted, the latter containing a little colourless mucus. The kidneys extensively affected with Bright's disease; the pelvis and ureters dilated; the bladder thickened, contracted, and empty. No trace was found of the puncture. The urethra below the bulb showed evidence of much disease and injury from instruments. The canal communicated, by a soft sloughy opening, with an ill-conditioned abscess and broken-down tissues deep in the perineum.

CASE XX. W. B—, æt. 51; admitted into Guy's Hospital February 28, 1849. Had suffered, during fifteen years, from gradually increasing symptoms of stricture. Had had frequent attacks of retention, and undergone corresponding courses of catheterism. His canal was quite impermeable, and micturition difficult and painful. He remained in the hospital under treatment for three months, without any material improvement being effected in his condition, and his bladder was punctured by Mr. Cooper on May 24. The canula came out at the end of ten days, and he continued, for some time, to pass a portion of his urine through the recto-vesical opening. The condition of the urethra underwent considerable improvement after the operation; and when he left the hospital, June 20, he could micturate with tolerable ease and comfort.

CASE XXI. H. L—, æt. 24; admitted into Guy's Hospital November 14, 1850. When seven years old he received an injury to his loins and pelvis by the fall of a sack of flour, which induced temporary retention and the passage of bloody urine during some days. He perfectly recovered, and never experienced any urinary difficulty until three months ago, when he was kicked by a horse on the left iliac region. This was immediately followed by symptoms of stricture, for which he had since undergone considerable instrumental discipline, until retention became complete, and he was admitted into the hospital. Mr. Cooper punctured his bladder the same evening. In two days after the operation urine began to pass by the natural passage, and in two days more an elastic catheter was introduced into the bladder. He soon got well and left the establishment.

CASE XXII. Mr. John Birkett has furnished me with the following case :

H. D—, æt. 50, was admitted into Guy's Hospital August 19, 1851. Broken-down constitution, emaciated, and cachectic. Had experienced symptoms of stricture during fourteen years, and had been subjected to much catheterism. Unceasing attempts had been made the day previous to his admission to introduce an instrument, but without success. The distended bladder reached nearly to the umbilicus, and the whole of the perineal portion of the urethra was extremely hard and painful. Warm bath, opium, &c. failed to give him relief, and he was suffering intensely. A catheter introduced into the urethra passed readily behind the prostate and neck of the bladder. His bladder was punctured by Mr. Birkett, and a quantity of dark ammoniacal urine was drawn off. During the next few days the local relief derived from the operation was complete; but his powers continued to fail, in spite of the stimulants which were administered. His belly was slightly tympanitic; his skin dry; his tongue brown and furred. On August 24, five days after the operation, the canula slipped out; but a short time afterwards he voided his urine without

difficulty through the natural passage. The next day he was unable to micturate, but Mr. Birkett was enabled, with perfect ease, to pass a medium-sized catheter into his bladder, and drew off half a pint of ammoniacal urine, with great relief. He soon afterwards became comatose, and died the next morning.

An inspection of the body could not be obtained.

In all probability renal disease, and perhaps latterly a low form of peritonitis, were the causes of this man's death; and the severe discipline to which he had been subjected for the purpose of relieving his retention may possibly have hastened the catastrophe.

In the following cases the bladder was punctured by my colleague, Mr. Poland:

CASE XXIII. J. S—, æt. 31; admitted into Guy's Hospital February 9, 1851. Stated that three years ago a catheter was passed into his bladder to relieve distension, since which he has experienced increasing symptoms of severe stricture. On his admission the distension was considerable and the distress great. The urethra was impermeably closed at the bulbous portion. Mr. Poland punctured the bladder, and gave him immediate relief. In a few days he began to pass his water by the urethra.

Feb. 16.—A catheter was passed into the bladder, and the canula removed. He left the hospital February 25, his canal apparently in good order.

CASE XXIV. T. W—, æt. 45; admitted into Guy's Hospital October 4, 1851. Had suffered some years more or less from stricture. On his admission his bladder was distended, and his urethra impermeable. The usual means having failed to afford him relief, his bladder was punctured by Mr. Poland. On the tenth day after the operation the canula was removed, as by that time his urethra had so far recovered itself as to allow the expulsion of his urine in a tolerable stream. There was now no difficulty in introducing a catheter into his bladder, and the canal was gradually

dilated until it would admit a full sized instrument. He left the hospital quite well November 21.

CASE XXV. G. D—, æt. 45; admitted into Guy's Hospital October 23, 1851. Had led a free life, and dates the existence of stricture as far as ten or twelve years back. Had been subjected at various times to much catheterism, and at different periods urinary abscesses had formed in the perineum. On two occasions he had suffered from renal affection, with anasarca and coagulable urine, and his health was altogether broken up. On his admission retention had been complete for several hours, his bladder was distended, and chronic extravasation was apparently taking place in an indurated perineum. The urethra was contracted, hard, and impermeable at the bulbous portion. His bladder was punctured by Mr. Poland, and he expressed great delight at being relieved from his trouble with so much less pain than he had frequently experienced from the introduction of a catheter. He retained the canula for about ten days, when it was removed, as a small flexible catheter could now be passed into the bladder. His general condition, however, continued to be very bad; a succession of abscesses formed on the nates and on one of his arms. An abscess was also opened in the perineum, from which, after the lapse of several days, a small portion of his urine escaped during micturition. The escape of water through the recto-vesical puncture ceased as his urethra resumed its normal function. His health continued to decline, and he was anxious to leave the hospital, which he did about the latter part of December.

After his removal he began to recover, and when I last saw him, January 30, 1852, he had greatly improved in health and strength.

CASE XXVI. W. B—, æt. 50; admitted into Guy's Hospital December 13, 1851. Had suffered from stricture for twelve years, and had been gradually getting worse, until at length retention became complete. No instrument had

ever been used until some hours previous to his admission, when persevering attempts had been made to pass a catheter, without success but with laceration to his urethra. His bladder was punctured by Mr. Poland late at night, and a large quantity of water drawn off. Unfortunately, the canula was accidentally pulled out while adjusting the tapes for its security. The next day the bladder was again distended, with complete retention and great distress, and it was again punctured by Mr. Poland. December 25, twelve days after the operation, he could pass his water by the natural passage, and the canula was removed. For several days after he continued to void a portion of his urine by the recto-vesical opening; but in about two weeks after the removal of the canula it all came the right way. He left the hospital January 14. I believe no attempts were made to pass a catheter, as he was enabled to micturate with perfect ease and in a fair stream.

He informed me that his first symptoms of stricture succeeded an injury to the perineum from a fall astride of a spar, followed by a considerable effusion of blood from the urethra.

CASE XXVII. W. S—, æt. 60, was admitted into Guy's Hospital December 30, 1849, suffering from total retention and incipient infiltration of urine. He could give but little account of himself, but it appeared that he had been variously treated for stricture during twenty-five years. Soon after his admission he was relieved by Mr. Poland, who introduced a small catheter into his bladder.

Jan. 1, 1850: complete retention, with increasing tumefaction of the scrotum and penis. His bladder was now punctured by Mr. Poland, with immediate relief and arrest of extravasation. The canula was retained in the bladder for nearly a fortnight, when a catheter was readily introduced through the urethra. He subsequently lost the greater part of the skin of the penis by phagedenic ulceration, but finally got well and left the hospital.

CASE XXVIII. — —, æt. 45; admitted into Guy's Hospital in 1850. He had complete retention and impermeable stricture. The urethra had been much injured by continued attempts to relieve him. His bladder was punctured by Mr. Poland. He left the hospital five weeks after the operation, at which time his passage admitted the introduction of a No. 4 catheter. He subsequently attended Mr. Poland as an out-patient until he was well.

CASE XXIX. — —, æt. 60; admitted into Guy's Hospital during the summer of 1851. Had suffered two days from retention supervening on an old stricture, and his urethra was much disorganised by attempts to relieve him. His bladder was punctured by Mr. Poland. When he left the hospital, some weeks after the operation, a moderate sized catheter could be passed into his bladder.

CASE XXX. — —, æt. 50; admitted into Guy's Hospital in July, 1850. Had suffered several years from an impermeable stricture, and had undergone much catheterism. On his admission retention had existed for thirty-six hours, and his urethra was torn and disorganised by recent attempts to afford him relief. The smallest sized silver catheter was passed through one of the false passages into his bladder, his water drawn off, and the instrument retained. During the night the catheter slipped out, and the next day retention was again complete, with great distress. His bladder was then punctured by Mr. Poland. The canula was kept in for eleven days, when a No. 2 catheter could readily be introduced, and his urethra was gradually dilated until he left the hospital, seven weeks after the operation.

My colleague, Mr. Hilton, has punctured the bladder eight times in Guy's Hospital. I possess notes of most of these cases; but as I believe they will shortly be published in a clinical lecture given by Mr. Hilton on the subject, I consider it neither necessary nor expedient to lay them

before the Society. I therefore requested Mr. Hilton to furnish me with the general results of his experience in this operation, which he has been kind enough to do as follows :

"I have had altogether eight cases—seven cases of stricture with retention of urine, demanding immediate relief by some operation. No important difficulty or untoward circumstance occurred in any one of these at the time of the operation, nor was it followed, in any instance to my knowledge, by any peritonitis. One patient died some time after the operation, and I found at the post-mortem examination that the trochar had in part divided the left vas deferens, or ejaculatory duct, close to the prostate. I do not think that this circumstance contributed anything to the fatal issue of the case. The rest of the cases I believe did well. The old stricture case (W. W.) makes the eighth. It was then I had the advantage of your experience and opinion, and your acquiescence to justify the proceeding of puncturing the bladder per rectum for the cure of a very obstinate and irritable stricture. The result was as favorable as possible: the patient became quite free from stricture.

"I must, in conformity with my own feelings, congratulate you as a surgeon, for having promoted, by your hospital practice, the revival of a most useful but much neglected operation on the urinary bladder."

I have thus been able to lay before the Society an abstract of thirty-eight cases of puncture of the bladder per rectum, all of which have come under my own observation. In every one of these, the operation may, I think, fairly be said to have been perfectly successful in accomplishing the object for which it was adopted; and in many cases I believe that it materially tended to the restoration of the patient, with a less amount of suffering, and at the same time more speedily and more effectually, than could have been effected in any other way. In no one of these cases was the operation, as far as I could judge, productive of any injury or ill consequence to the patient.

I have two more cases to bring forward, which, although they were amongst the earliest in chronological order, I have purposely separated from the rest, in order that they may be contrasted with those which have preceded them in my communication to the Society. In the one case I failed in my attempt to reach the cavity of the bladder. In the other I had substantial reason to believe that an injury was inflicted, which, although the patient was already in a hopeless condition, perhaps tended to hasten the catastrophic which was impending. I may, however, be permitted to say that I consider the failure in the one instance, and the mischievous results in the other, attributable rather to unskilfulness and want of due caution on the part of the surgeon than to any inherent vice in the principle of the operation.

CASE XXXIX. J. H—, æt. 33; admitted into Guy's Hospital December 26, 1847. A fat, intemperate man, addicted to great excesses. During the last three years he had had repeated attacks of retention, and had been severely catheterised every few weeks, until his urethra had become damaged, and permanent stricture induced. When admitted had voided no water since the preceding day; but a catheter was passed, and this was required again and again during the next five days, each introduction of the instrument causing fresh mischief to the urethra. On January 1, 1848, I found him in great distress with distended bladder. The urethra was now completely disorganised, and the catheter could no longer be passed. I attempted to puncture the bladder. The prostate was very large and high up in the rectum. After introducing the trochar I found that I had failed in reaching the cavity of the bladder; and as, under the circumstances, I did not consider it expedient to make a second attempt, I fell back upon the operation of forcible catheterism, and drew off the man's water with a small catheter.

Retention being once relieved, I was enabled by leeches, warm baths, opium, &c. to keep him going, until his

urethra was sufficiently recovered from its rough treatment to allow an instrument to be introduced with safety; and he left the hospital a few weeks afterwards, able to pass his water with comfort, and in a tolerably good stream.

In this case the quantity of urine drawn off was very disproportionate to the apparent size and the prominence of the bladder, indicating the great hypertrophy and thickness of its walls. This, together with the large size and depth of the prostate, and the shortness of the instrument which I used, was, I have no doubt, the cause of my want of success. The trochar probably buried itself in the walls of the bladder instead of entering its cavity; but had I given a less oblique and a more perpendicular direction to the instrument, I feel certain that I should have accomplished my object, as I have in subsequent cases succeeded in doing so where the difficulties have been equally great.

CASE XL. C. J—, æt. 31; admitted into Guy's Hospital September 1, 1847. Had suffered five years from severe stricture. A year ago had retention, and during some months afterwards underwent a cruel course of catheterism without any passage being effected, and with great aggravation of all his symptoms. For many weeks he had only passed his water in drops, and with extreme pain and difficulty. The intolerance was most distressing; his urine was loaded with ropy mucus, and there could be no doubt that his bladder and kidneys were extensively diseased. The urethra appeared to be all but obliterated; the perineum was swollen, as hard as marble, and presented two or three minute fistulous openings. About a month after he had been received into the hospital, I was requested to see him on account of the extreme agony he was enduring, and the next day met my colleague (under whom he had been admitted, and by whom he had been treated,) in consultation as to the best means of giving him some relief during the short remaining period of his life. There was no distension, and the bladder could not be felt with any degree of distinctness or certainty above the pubes; but on examination per

rectum, I could distinctly feel a yielding fluctuating prominence at the end of my finger, which received an impulse from pressure made over the corresponding part of the abdomen. Under all the circumstances, it was considered inexpedient to cut into the perineum with the view of making a doubtful search for the urethra; and as the canal was utterly impermeable, even to forcible catheterism, I undertook, by the wish of my colleague, to attempt the puncture of the bladder through the rectum. I accordingly introduced the trochar at the fluctuating spot I have just described. A small quantity of urine, not more than half an ounce, flowed through the canula and then ceased; and as no more came away, after the lapse of a few hours, the instrument was removed.

The result of the experiment was anything but satisfactory; but during the remainder of his life, the pain, misery, and intolerance he had endured were effectually relieved by the constant distillation of his urine through the recto-vesical puncture. He gradually sank, became comatose, and died about a month after the operation had been performed.

*Inspection.*—The kidneys were extensively diseased, and there was peritonitis at the *upper* part of the abdomen, with some purulent effusion. The greater part of the urethra was obliterated; but, behind the obstruction, a small part of the membranous and the whole of the prostatic portion of the canal was dilated into a pouch, resembling in size and shape an elongated hen's egg, and forming a sort of subsidiary anterior bladder. The bladder itself was enormously thickened, and permanently contracted into a ball, presenting no cavity whatever. The puncture between the subsidiary pouch and the rectum formed a pretty free opening of communication, and the tissues around it were normal and unaltered.

A sloughy abscess existed in the cellular tissues behind and above the pubes, and communicating with this I found a small apparently ulcerated opening passing through the anterior walls of the pouch into its cavity. This opening

was exactly opposite to the recto-vesical puncture, and was probably caused by the point of the trochar. The diameter of the pouch at this part was indeed so small, as to render such an accident the almost inevitable result of the operation.

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POSTSCRIPT, *Aug.* 1852.—The trocar and canula which I am in the habit of using for puncturing the bladder, are essentially similar to those which have been hitherto employed for that purpose; but I have found it advisable to increase their dimensions in length and thickness. I have also added a blunt-pointed or pilot trocar, which very much facilitates the introduction of the canula into the rectum, and its adaptation to the precise spot intended to be pierced. I likewise found it necessary to adopt some contrivance which should retain the canula in the bladder during change of position or evacuation of the bowels, and which might at the same time prevent the sharp extremity of the instrument from wounding or irritating the lining membrane of the viscus. This double object has been fully accomplished by the introduction of a second tube split at its extremity into three expanding branches, each of which is furnished with a small bulb, and form together a button-like projection at the end of the first canula. A third tube is then introduced through the second to secure it in its place and to prevent the collapse of its branches.

With this apparatus the canula may be retained in the bladder for as long a period as occasion may require.

A small disc of caoutchouc around the second and third tubes, and a plug of gutta percha, renders the entire instrument watertight, when it is considered desirable to allow the urine to accumulate in the bladder.

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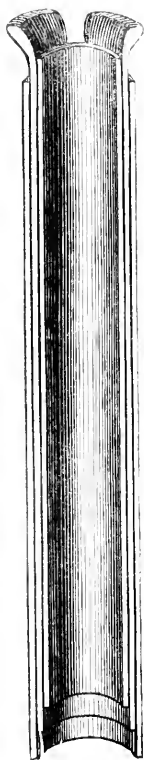
Fig. 1 represents the trocar;—the size reduced.

„ 2, the canula with its two internal tubes in situ.

„ 3, an enlarged section of the same.



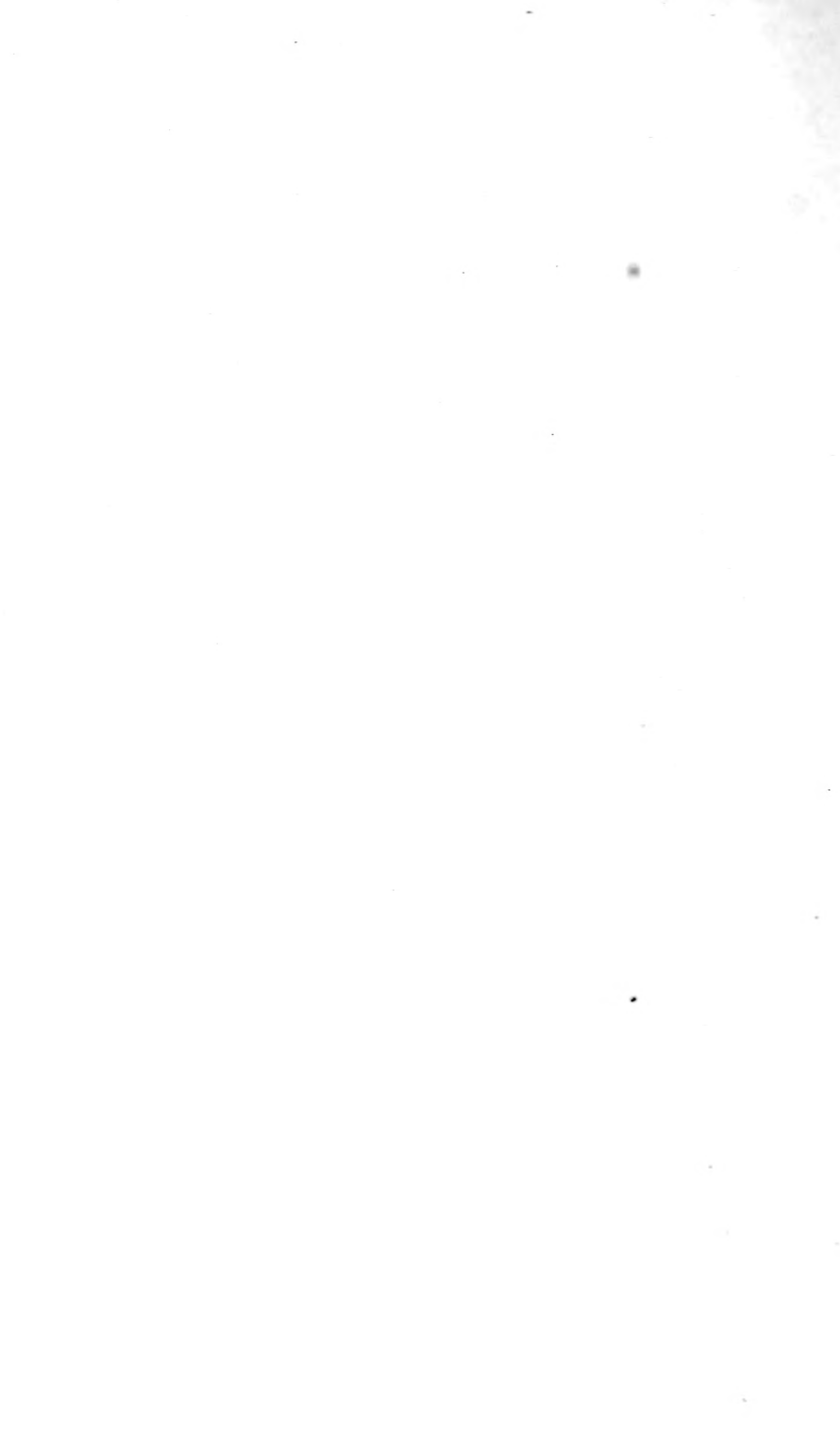
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3



1



ON THE  
DEPOSITION OF FIBRIN  
ON THE  
LINING MEMBRANE OF VEINS.

BY  
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M. GENDRIN, in his '*Histoire Anatomique des Inflammations*,'<sup>1</sup> cites an experiment upon which much stress has been laid by subsequent writers, and from which the existing theory respecting the mode of formation of lymph in inflamed vessels has derived much of its support.

If, says M. Gendrin, an irritating injection be thrown into a portion of an artery included between two ligatures, emptied of its blood, and washed, the inflammation which follows is characterised by the formation of a plastic layer, which lines the internal membrane, and ultimately fills up the cavity of the vessel. This is accompanied by an obscure redness of the lining membrane, which is not under the circumstances stained of a violet red colour by the imbibition of the colouring matter of the blood, as happens when the vessel is filled with the coagulum.<sup>2</sup>

In repeating his experiments upon veins, M. Gendrin arrived at similar results, but found that the lining membrane of these vessels increased in thickness to a greater extent than that of the arteries, that they suppurated more

<sup>1</sup> Paris, 1826.

<sup>2</sup> Tom. ii, p. 13.

quickly, and that they always afforded readily a concrete layer of lymph, which obliterated the vascular canal.<sup>1</sup>

Hassé, in his 'Pathological Anatomy,' has followed Gendrin, and believes that the induration of inflamed veins depends partly upon the coagulated blood which they contain and partly upon the lymph secreted from the lining membrane into their interior.

English pathologists have generally adopted the same view, and coagulable lymph is spoken of by them as capable of being effused as readily on the lining membrane of veins as upon the peritoneum or pleura. The writers who have thus regarded the internal surface of the veins as analogous, in a pathological point of view, to a serous cavity, are so numerous that it might seem superfluous to refer to any individual treatises upon the subject; but, if necessary, quotations might be taken from works of pre-eminent authority, not only in this, but in every country of Europe. Thus, in the first sections upon diseases of the veins in Mr. Hodgson's most justly celebrated work, it is stated that "the veins are liable to all those morbid changes which are common to soft parts in general; but the membranous lining of these vessels is peculiarly susceptible of inflammation. . . . This inflammation sometimes produces an *effusion of coagulating lymph*, by which the opposite sides of the vein are united, so as to obliterate the tube; in this manner, a great extent of the vessel is occasionally converted into a solid cord."

Again, in Mr. Travers's most valuable treatise on Inflammation, the existing theory is summed up in the following words:—"The false membrane, as it is called, within the visceral chambers, canals, and blood-vessels, are depositions of fibrine *secreted by the capillary vessels under inflammation*."

Finally, in a very able article now in the press for the 'Cyclopædia of Anatomy and Physiology,' I have reason to believe that similar views are maintained. In the face of so much traditional authority, no small degree of responsibility is involved in stating an opinion to this Society in any

<sup>1</sup> Tom. ii, p. 15.

degree at variance with that which has hitherto been maintained upon the subject ; nor should I venture to do so had I not direct observation and experiment to appeal to.

In the year 1848 I was first led to suspect the correctness of the current explanation of the pathological appearances observed in cases of phlebitis, by noticing that no irritation or inflammation occurred (in cases where it might have been expected) if the blood were prevented from stagnating in the vessels. An animal, for instance, had some pus injected into its brachial vein, and was killed on the third day. The vitiated blood had, at the time of the experiment, been prevented from lodging in the vessel by mechanical pressure in the course of the circulation. On examining the vein after death, its lining membrane was found of its natural smooth, polished, and lubricated appearance. The opening that had been made in the experiment was filled by some brownish granular matter, and no other local morbid appearance presented itself. About the same time a case occurred where a man had received a spike wound at the back of the head, which penetrated into the lateral sinus. This patient died of repeated hæmorrhage, several days after the accident. Although different styptics had been during his life introduced to the bottom of the wound, yet was there no inflammation of the vein produced. The lining membrane presented its natural polished surface. In another case, a patient died of symptoms of poisoned blood, after the operation for hæmorrhoids by ligature. On examining the parts, a vein was found terminating upon the wound produced by the operation, but its lining membrane presented nothing remarkable.

In these instances, no coagulum had formed in the wounded vessels. The blood, which was found fluid after death, had flowed through them in its natural course ; and it appeared to me probable that, where coagulation of the blood did not take place, lymph was not so readily produced upon the lining membrane of veins as was generally believed.

In pursuing this subject, it was found that even a small

quantity of purulent matter introduced into a vein would determine the coagulation of the blood which it contained, if not prevented by mechanical interference. The examination of such cases afforded the strongest contrast to those above mentioned. Large fibrinous clots were found obliterating the cavities of the veins, the coats of which presented the well-known marks of having been acutely inflamed. These fibrinous plugs were in some parts composed of blood, which, in becoming firm, had moulded itself to the shape of the vessels; but in other parts the fibrin was entirely deprived of its colouring matter, and adhered firmly (as in preparation No. 3) to the sides of the vein.

The cellular membrane around the veins was found in these cases loaded with serum, lymph, and pus, the results of inflammation which had evidently been excited by the morbid matter detained in them by the coagulated blood.

In examining the specimens contained in the different museums of London, it will be difficult to find an instance where lymph has been deposited upon the lining membrane of a vein, and where the blood has not coagulated in the vessel. In many cases (and I may instance particularly some of Dr. Lee's beautiful preparations in the museum of St. George's Hospital) the same vein will be seen inflamed where a coagulum has adhered to it, but presenting its natural smooth and polished surface where this has not been the case. On finding, therefore, fibrin adhering to the lining membrane of veins only when coagulation of the blood had taken place, a doubt was raised whence this fibrin was derived; and it became a point of much interest to endeavour to determine whether it was really the product of inflammation, or whether it might not be deposited directly from the blood by a modified process of coagulation.

The results obtained by M. Gendrin above referred to, which have been so generally received, would appear directly to support the former theory, and, if made with sufficient care, must have finally determined the question. But from the description he has left, a source of fallacy appears not to have been guarded against in his experiments. It is not

stated that any means were used to prevent hæmorrhage into the cavity of the vessel between the two ligatures. Such hæmorrhage might occur after the operation, either from the divided vasa vasorum in the case of an artery, or from some collateral branch, or from the vasa vasorum which open into its cavity, in the case of a vein. The observations which I had made led me to suspect that the results which M. Gendrin had obtained depended upon this cause, and that the fibrin had been deposited from blood which had gained admission to the vessels after the ligatures had been applied. I therefore determined to repeat M. Gendrin's experiment, and to observe whether, if the blood were carefully excluded from the cavity of the vein, lymph would still be effused upon its lining membrane.

By the kindness and liberality of Mr. Mayer, veterinary surgeon, every convenience and assistance were afforded me for performing the experiment; and the results obtained it is my principal object now to lay before this Society. The left jugular vein of a donkey was exposed, and two ligatures were placed upon it at an interval of something less than four inches. The vein was open for about an inch, near the centre of the exposed portion, and all the blood which it contained was carefully removed. The cavity of the vessel included between the two ligatures was now filled with cotton wadding. This was introduced piece by piece, and was pressed tolerably firmly towards the lower or sternal extremity as far as the ligature. Some of the cotton wadding was also introduced, but in less quantity, towards the upper ligature. The vessel was then carefully closed, its divided edges being sewn together with a needle and thread. Finally, the lower or sternal ligature was removed, and the wound in the integuments closed by a number of stitches. The lower ligature was removed in order to leave the circulation in the outer coats of the vessel as free as possible, the plug of cotton wadding being deemed sufficient to prevent any regurgitation of blood into its cavity. Immediately after the completion of this operation, a small portion of the cotton wadding was carefully introduced into the peritoneal

cavity, and the wound made in the abdominal parietes closed by suture.

The means were thus afforded of testing the difference which would be produced by the irritation of cotton wadding, in contact with the peritoneum and in the cavity of the vein, and of observing whether these parts were really analogous in their morbid actions. The animal was killed at the expiration of forty-four hours. On opening the abdomen, the peritoneal cavity was found to contain a considerable quantity of serum, and the peritoneum itself was much injected in different parts. The piece of wadding was found completely enveloped in a thick coating of lymph. The omentum, and a portion of the colon with which it was in contact, were injected to a high degree, and the latter especially presented a very large number of spots of a bright red colour. These appearances have been represented in the accompanying drawing by Dr. Westmacott.<sup>1</sup> On examining the neck, the parts about the lower portion of the jugular vein were much swollen and infiltrated with serum. The coats of the vein were found somewhat thickened for some distance below the seat of the operation. On slitting open the vein, some loose fibrin of a greyish white colour occupied its cavity below the cotton wool. Portions of this could be separated with the slightest force from the lining membrane of the vein, which was then left of its natural smooth, polished, and lubricated appearance. Immediately in contact with the wadding in this situation were some very small coagula of blood. These imperceptibly lost their colour, and faded into the appearance of the lymph with which they were, in substance, evidently united. Between the upper ligature and the head, the vein was of its natural appearance. The blood which it contained was fluid, with the exception of a loose unattached coagulum which floated in it. The point at which the upper ligature had been applied was thickened, and the circumference of the vein was here marked by an opaque white ring, about a line and a half in breadth.

<sup>1</sup> See also Preparations I, L.

The part of the vein included between the two ligatures is that to which I wish particularly to direct attention. The lining membrane here was of rather a deeper colour than natural, *but in no point did it present any trace of effused lymph.* The results of the irritation here afforded the most marked contrast to those produced by similar means in the peritoneal cavity. The whole of the lining membrane of this portion of the vein presented a smooth and polished surface, and the valves which it contained were not perceptibly thickened.

The point at which the effusion of decolorised fibrin, observed in the sternal portion of the vein, terminated, was defined with the greatest exactness. This was exactly where the lower of the two ligatures had been applied.

On removing the vein from its bed, it was observed that suppuration had distinctly taken place in some circumscribed portions of the surrounding cellular tissue.

The principal conclusion to be drawn from the preceding experiment and observations is, that the analogy which has been supposed to exist between the lining membrane of blood-vessels and the closed serous cavities of the body cannot be maintained, with regard to their morbid processes; and consequently that the mode of treating inflamed veins which has been based upon the supposed resemblance is not founded upon sound physiological principles.

Another point of secondary importance, but by no means devoid of interest, is the power which the blood is shown to possess of separating directly from itself a fibro-albuminous element, without the intervention of any membrane and independent of any inflamed surface. The true pathology, and consequently the rational treatment, of obstructed veins cannot, I apprehend, be arrived at, without considering the proximate cause of the changes observed upon post-mortem inspections in the contents of the vessels and in the surrounding parts. That violent irritation is often produced in such cases, the amount of pain, swelling, and effusion abundantly testify. But in what part are the effects of this irritation first apparent? Not in the lining membrane of

the vein, but in the surrounding areolar tissue. In the experiment above related, the internal coat of the vein was scarcely changed in appearance; the outer coverings were slightly thickened, but the surrounding cellular membrane had actually suppurated. Here, then, was the seat of the inflammation; and for what ulterior object was it established? Evidently for the purpose of getting rid of a foreign substance lodging in the vein.

The process here observed is quite analogous to that which takes place when any vitiated secretion finds its way into the circulation, and is retained in a vein. The surrounding areolar tissue will become inflamed, loaded first with serum, and then with lymph and pus, before the coats of the vein have taken on any similar actions. The process by which, in either case, the morbid matter is to be eliminated, extends *to* the lining membrane of the vein, and not *from* it.

During the time that this surrounding inflammation is being established in ordinary cases of phlebitis, still more important changes, although of a different nature, are taking place within the vein. Its contents, as I have attempted to show, almost invariably become solid before its coats are thickened, and even before the surrounding parts have begun to inflame. The proximate cause of this, it is not difficult to conceive or to illustrate by experiment. The effects produced by the admixture of pus with blood previously referred to, evidently show a latent sensibility in the blood ever ready to be called into action for the preservation of the system. Foreign matter, which would otherwise be carried in the course of the circulation, is by this means confined to one part, and produces only a local irritation. When morbid matter is thus detained in a vein by the coagulation of the blood, the inflammation of that vein will be much greater than if the vitiated matter could, in part or altogether, escape into the general circulation. This is quite in accordance with the wisest economy of nature,—an economy which we cannot too much admire, by which, when her intention is not frustrated, a part is sacrificed for the preservation of the whole. After diseased fluids have in this way entered

into a kind of combination with the blood, further changes take place.

If the proportion of morbid matter be large, the whole coagulum will rapidly soften, and present to the naked eye the appearance of pus more or less discoloured. But if the quantity, which has become mixed with the blood, be small, the coagulum will retain its consistency and become adherent to the sides of the vessel. Under these circumstances the coagulum will adhere to one side only of the vessel, and as it contracts, the diameter of the vessel will be restored to its original size. In other cases the outer layer of the coagulum will become adherent to the whole circumference of the vein, and the inner portions, which are always the least consistent, will become softened and broken down. A complete cylinder of fibrin may, in this way, be formed in the interior of a vein, through which (when the fluid portions of the coagulum are removed) the blood will circulate. It is worthy of remark that when plugs of fibrin are thus formed, the adjacent lining membrane of the veins are coloured in exact proportion to the quantity of colouring matter contained in the coagula. In a preparation on the table, the vein may be observed to be deeply blood-stained where in contact with the dark coloured clot, but to retain its natural appearance where its contents are decolourised. The changes which take place in the interior of veins now mentioned, may be referred, I conceive, entirely to actions in the blood itself, so long as the lining membrane of the vessels remains entire. The adhesion of the coagulum, and the changes which it undergoes, are no way dependent upon secretion from its lining membrane.

This opinion is quite in accordance with what is known of the minute anatomy of the blood-vessels. In no case have vessels, I believe, been observed on the delicate fenestrated membrane which lines the veins either in health or disease. There would, in fact, be no object in providing a surface with blood-vessels which is already in contact with the blood. This fact alone might lead to the inference, that the results of inflammation in a vein would be different from those

observed in serous membranes; and especially might it, *à priori*, induce us to believe that the deposits, under such circumstances, on the lining membranes of veins, would differ from the ordinary products of inflammation in their origin and mode of formation.

The opinion, that the material found in obstructed veins is derived directly from the blood, is further supported by the fact, (which was well illustrated by preparation No. 2, when in a recent state,) that where a coagulum is formed, and becomes incorporated with the coats of a vein in one part, the lining membrane of the vessel in its immediate neighbourhood may, nevertheless, present its natural shining appearance. Did the union, in such a case, depend upon lymph effused by inflammation, the alterations in appearance of the lining membrane would not be limited exactly and precisely, in the first instance, to the points of adhesion, and be found in no other part.

Again, we should naturally expect that a secretion, derived from the lining membrane of a vein, would adhere equally to every part of its circumference; but in the case we are considering this does not usually happen. Adhesion will take place upon one side only of the tube, and the lining membrane will, in other parts, present its natural appearance.

The process which here takes place is quite analogous to that which occasionally occurs when blood is effused in the serous cavities of the body, and which has been so admirably illustrated by Mr. Hewett in vol. xxviii of the 'Medico-Chirurgical Transactions.'

When blood is effused in the arachnoid cavity, Mr. Hewett has shown that a smooth and polished layer will form upon its surface; and that this newly-formed substance will present the external characters of a serous membrane. Such adventitious layers were long supposed to be formed by lymph secreted by the serous membranes in which they were found;—a supposition which has also long been maintained with regard to similar formations in the cavities of veins. But it must be evident in either case, that if these membranes were

formed by lymph the product of inflammation, they would adhere to all the surfaces with which they are in contact ; whereas the greater part of their circumference is generally found smooth, polished, and lubricated.

Finally that the material which, in the first instance, lines the cavities of obstructed veins, is derived exclusively from the blood, appears to be directly proved by the experiment which has now been laid before the Society.

The point of the vein most irritated, but to which the access of blood had been derived, contained no deposit or secretion of any kind, although exposed to the contact of foreign matter for forty-four hours previous to death.

I have been the more careful in endeavouring to establish this point, inasmuch as the treatment of phlebitis has necessarily been influenced, in a great measure, by the ideas which have been entertained of its pathology.

Attempts have usually been made to subdue the prominent inflammatory symptoms by bleeding, either general or local, or by the administration of calomel and opium. M. Cruveilhier even ventures to assert that every case of phlebitis may be cured by the application of a sufficient number of leeches, often enough repeated in its incipient stage. There can be no doubt that the patients thus treated often survive both the disease and the remedies, still oftener are the prominent symptoms apparently relieved. But if the view which has now been taken of the real nature of this disease be correct, what does the sudden disappearance of the local symptoms imply? Experience proves that but too often they subside in one part only to manifest themselves in another ; and it not unfrequently happens that a day or two before death, the local symptoms have attracted less attention than at any other period of the disease.

How constantly do we see that an inflammation in the arm after bleeding will subside only to develop itself in the opposite arm, or in one of the lower extremities, if not in some internal organ! We have here the explanation of the recorded description of cases in which it is stated that the patient was often bled, and every time with much advantage ;

but that, unfortunately, a day or two before death, his strength had so far given way, as to require the use of cordials.

It were wiser, in my opinion, to adopt and follow out the hint given us by the yet unimpaired powers of life, in combating this disease.

Unaided by medical assistance does the blood itself fix the morbid matter which threatens the constitution to one point of the vascular system. Here it produces an irritation, the object of which is to expel the foreign matter. Bleeding and calomel will perhaps prevent the development of the inflammation established for this purpose; and they do so, I conceive, *by destroying that power in the blood which tends to localise the disease*. Calomel loosens newly-formed adhesions, and bleeding renders the coagulating power of the blood feeble; and under their influence, any morbid secretion retained in a vein would be likely to be translated to some other part of the system. When this occurs the constitution may still have power to throw off the diseased matter which has excited the irritation, and this is often done by the secretions of the bowels and liver. But in severe cases, I cannot but doubt the propriety of putting *the powers of the constitution to this test*.

The second point which I wish briefly to notice, with regard to the preceding experiment, is the similarity in the appearance of the lymph secreted from the peritonæum and the fibrin deposited from the blood. The two presented, as nearly as possible, the same colour and external aspect, but differed materially in consistence. The lymph adhered on all sides firmly to the surrounding parts, whereas the fibrin could be detached with the slightest force.

That the deposit in the vein was really fibrin, is evident from its having taken place only when the blood came in contact with the cotton wadding and the vein; from the facility with which it could be detached from the lining membrane of the vessel, which was then left of its natural appearance; and, lastly, from portions of the fibrin being continuous, and united with small coagula unchanged in colour.

It would thus appear that the blood has the power of separating from itself, independent of the intervention of a membrane, a fibro-albuminous element resembling lymph in its characters : and the observations previously made show, I think, that this is the material which lines the cavities of inflamed and obstructed veins, so long as the lining membrane remains entire. It is found sometimes in rounded masses, having more or less the shape of a coagulum of blood ; at other times it is expanded into membranous layers ; and there can be little doubt that occasionally it becomes softened, broken down, and discharged, either into the current of the circulation, or externally from the vein together with the pus from surrounding parts. An attempt to prevent the deposition of this fibrin on the internal coats of diseased veins, by bleeding and antiphlogistic remedies, must be as futile as it is unphilosophical. And even could this be accomplished, it would be at the expense of the reparative processes which are taking place. It would deprive the parts of the very means used by nature for the reparation of local disease, and for the preservation of the system.



ON THE  
OCCASIONAL ORGANIC UNION  
OF  
CONTIGUOUS TEETH.

BY  
S. JAMES A. SALTER, M.B., M.R.C.S.

COMMUNICATED BY  
THOMAS BELL, Esq., Sec. R.S.

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THE following Paper contains a few observations on a peculiar and rare abnormal condition of the human teeth, which consists in the *organic union of contiguous individuals*, a departure from the natural condition and arrangement, which, though extremely uncommon, is nevertheless of much importance, where it does occur, to the dental surgeon, and is no less interesting to the physiologist, to whom it suggests questions as to its mode of production, and matter of some significance as to the development and source of the tissues of the teeth.

The fact that a union of neighbouring teeth does really occasionally occur is not now, I believe, ever called in question; and though for some time after its first publication by Mr. Fox it was disputed and denied, it is treated of in all the more recent practical works on diseases of the teeth.

Although, however, the circumstance itself is admitted, I am not aware that any anatomist has yet described the manner of junction of the teeth, or has demonstrated microscopically by which of the tissues the union is effected.

And even those who have done much in questions of microscopical tooth structure, have merely suggested that in these cases the union has probably been produced by the bone, or cementum of the fang, an opinion which is not confirmed by the specimens examined by myself.

It is my object, therefore, in the present communication, not only to enumerate additional instances of dental union, but to demonstrate the nature of that union, and suggest its probable mode of production.

The earliest notice of this peculiar condition with which I am acquainted was given by Mr. Fox in 1803. He observes, "Sometimes in the formation of the teeth two pulps unite, and upon their surfaces appear as two distinct teeth; but upon attempting to remove one it is discovered to be united to the next."

It is this statement that was called in question.

The next observation upon the subject was made by my relative, Mr. Bell, in 1829, who, in his work on the teeth, remarks: "The intimate and inseparable connection of two teeth by means of a true bony union<sup>1</sup> of their roots and sides, though not a frequent occurrence, is too well established by facts to admit of a moment's doubt. I have met with six instances of it in my own practice."

I am aware of two other recorded examples of this malformation; one given by Mr. Tomes in his work on the Teeth, as having occurred in the practice of Mr. Rogers, and another published in the 'American Journal of Dental Surgery.' Added to these are the two specimens, drawings of which accompany this Paper.

It is not a little remarkable that, considering how few cases are on record, almost all classes of teeth appear to have been subject to this affection, a circumstance which shows that there is nothing in the form or development of any

<sup>1</sup> It is evident that the term "*bony union*," used by Mr. Bell, was not intended to convey the idea that the union was effected by *crusta petrosa*, or true bone. At the time Mr. Bell wrote, what we now know as *dentine* was considered *dense bone*.

particular teeth, or any region of the mouth, more calculated to produce it than any other.

Of the three cases that occurred to Mr. Fox, one consisted in a union of the central incisors of the lower jaw by their fangs and the sides of their necks and crowns; in another the second and third molars of the upper jaw were united by their fangs; and in the third the fangs of the second lower bicuspid and first molar were completely fused together. These are still to be seen in the Museum of Guy's Hospital.

In the six examples which occurred to Mr. Bell, three consisted in the lateral union of the temporary superior central incisors. The other three are undescribed; but I am informed by Mr. Bell, that they were in one case the permanent superior central incisors; in another the second molar and dens sapientiæ of the upper jaw; and in the third the permanent inferior central incisors. The latter he has since met with more than once.

The example which occurred to Mr. Rogers exhibited union of the fangs of the second and third molars of the upper jaw.

In the American case, before referred to, the union existed between the lower bicuspid on one side.

The specimens, the drawings of which accompany this Paper, display the connection of other teeth. In the one case the union is between a lateral incisor and a cuspidatus; in the other between a dens sapientiæ and a supernumerary tooth.

Thus, in these few recorded examples, we see that individual teeth of each kind have been the subjects of this peculiarity—teeth of the upper and of the lower jaw; the temporary and the permanent teeth; regular and supernumerary teeth; molares, bicuspides, cuspidati, and incisores. Considering how few instances have been reported, this diversity is quite remarkable.

I will now call the attention of the Society to a more precise description of my own specimens.

The first that I have to describe consisted in a united cuspidatus and lateral incisor. The teeth were completely

united by a very broad union. When viewed superficially the crowns of the teeth appeared distinct, and the lateral incisor slightly in advance of the cuspidatus; and the division on the surface which separated them down to the necks was so marked, as to render it probable that a casual observer, or careless operator, would be unaware of their junction. Below the necks the fangs had become completely fused together; and though the junction of the roots at the upper half was indicated by a groove, the rest of them was so completely fused together as to obliterate all indication of a double origin. (See fig. 1, *a*.)

Upon making sections of these teeth, I had an opportunity of seeing what has, I believe, never been seen or described before,—the mode of union, and the nature of the uniting medium between the individual teeth.

A section through the crowns of the teeth, made transversely, midway between the summit and the neck, exhibited a form of the figure 8; and it showed clearly to the naked eye a mass of dentine surrounded by enamel, and interrupted only by a small pulp cavity in each of the teeth. Between these pulp cavities, where the union existed, there was no break of surface, and nothing in the aspect of the dentine to indicate that the teeth were distinct individuals. The enamel did not appear to pass between them. (See fig. 1, *b*.)

The question was settled by microscopical scrutiny.

A thin section of these teeth displays within the enamel a mass of dentine, consisting of tubes radiating from each pulp cavity, and passing across the union without interruption. Near the edges of the teeth this continuity of tissue is most distinctly seen; the tubes from one pulp can be followed across the line of junction, and are seen to end upon the inner surface of the enamel of the opposite tooth.

In the centre, however, between the teeth, the section divides the tubes in an oblique direction, as they are not on the same plane with it. They are thus seen more or less cut across, and cannot be traced in lines; but there is clearly no interruption of tissue: it presents exactly the same appearance as any other mass of dentine viewed in

oblique section. This will be better understood by reference to the accompanying drawing. (See fig. 2.)

There is, however, one point which is curious and interesting; it is, that at the margin of the teeth, where they come in contact,—at the extremities of the line of union,—there are two small mammillary projections, one on each side, occupying the interval left by the curving inwards of the outline of the teeth. These appearances at once suggest the idea that, when in a soft and plastic condition, the pulps were firmly pressed together within their sac, and that where they met they were pressed out, as it were, into these little eminences.

The other specimen that I have to describe consisted in a united supernumerary tooth with a dens sapientiæ of the lower jaw. The latter tooth presented nothing unusual in its form; but was in every respect a perfectly natural dens sapientiæ. I would particularly observe upon the complete formation of this tooth, it had the usual number of cusps and fangs, so that the supernumerary tooth could not be considered as a portion of this tooth separated from the rest. The supernumerary tooth was much of the form and character that these teeth usually present, irregularly cylindrical and twisted. These teeth were united together by their necks; the crowns were perfectly distinct, and there was no continuity of enamel at any part. The fangs were quite separate; and the pulp cavities did not appear to have any where coalesced. (See fig. 1, *d*, *e*.) A section through them at the point of union presents an irregular form. In the dentine are seen pulp cavities corresponding with the fangs of the teeth. (See fig. 1, *f*.)

On account of the obliquity of the crown of the supernumerary tooth, the section which cuts the neck of the dens sapientiæ, passes through the crown of the former; so that whilst the dentine of the wise tooth is seen to be surrounded by crusta petrosa, that of the supernumerary is bounded by enamel.

By referring to the drawing it will be seen, far better than can be described, that the dentine of both teeth is

continuous and unbroken, as in the other specimen, and that the structural union is complete. (See fig. 3.)

These two specimens then establish the fact, not only that the teeth are occasionally united together, but that the union is effected by a fusion of the dentinal tissue of the two individuals; and in these cases at least the union could not be said to be *bony*. It appears, however, not otherwise than probable, in some cases of slight union of the fangs, that the connection may be effected by *crusta petrosa*. It is possibly so in one of Mr. Fox's specimens in the Guy's Museum.

As regards the development and formation of these united teeth, it appears certain that calcification must have commenced upon distinct pulps within the same sac. That the pulps were from the first in actual contact, cannot, I should imagine, be doubted, not only from the proximity of the two teeth, but from the absolute continuity of the tissue composing them. Moreover, in the first specimen referred to, it would seem, from certain appearances observable at the margin of the union, that, when in an early condition and prior to calcification, the pulps had received an amount of pressing together at their surfaces.

There is still another point of much physiological interest and significance noticeable in the first specimen; between these teeth, where they are united at the crowns, no enamel is found; whereas, on every part of the surface which was exposed to contact with the interior of the sac, the organs are clothed with enamel, a circumstance which not only indicates that the pulps were from the first in contact, but is also an additional proof (if indeed such were wanting) as to what is the source of the enamel, and that, as described by Hunter and subsequent anatomists, it is really the product of the inner surface of the dental sac.

Although the adhesion of two teeth together must be looked upon as an abnormal condition, still in the absence of all morbid products and change, it may be considered as one of the lowest order, and abnormal in the slightest degree; and viewed in relation to the development of dental forms

and tissues, it can scarcely be considered as more than the result of some modifications in the papillary and follicular mouldings of the mucous surface which occur in the earliest stages of tooth-development. And considering that the near proximity of two pulps, or the imperfect formation of the septa between the sacs, would furnish circumstances favouring (if not determining) its production, it is rather a matter of surprise that this deviation from the natural condition is not much more frequent.

The union of distinct teeth, formed upon separate pulps, and exhibiting the anatomical form of perfect teeth, is merely an exhibition of the same sort of process on a large scale, as we see in miniature in the formation of every tooth with more than one cusp. Each cusp commences, as each single tooth, by a separate calcific centre upon a single eminence of pulp; upon, in fact, a miniature tooth pulp; and, when these become confluent, they show through a very short space, near the summit of the crown of the teeth, the same relation in section as I have described in my specimens; and it only needs a deep fissure between the cusps to render the analogy more complete. These, however, are normal; what I have described are abnormal; nevertheless, a departure from what is natural more in form, position, and degree, than in kind.

Having established the anatomical fact of dentinal union of distinct teeth, I will say a few words on its practical bearings.

It is obvious that two teeth may be united side by side, though apparently distinct organs; one may be diseased and require extraction, and the other be sound. Now, in the *majority* of cases I have cited, it would have been impossible to have ascertained the union of the teeth whilst in the jaw. In *all* the recorded cases it would have been impossible to have separated the attached teeth before extraction. From these grounds it is obvious that some few cases have occurred, and will, in all probability, occur again, in which the surgeon, in removing a tooth, removes two, without anticipating such

a casualty, and even had he suspected it, without having it in his power to prevent it.

Since the above Paper was written, another example of this condition has come under my notice. A young gentleman presented himself for advice on account of the peculiar appearance of the right central and lateral incisors of the lower jaw. These teeth, which are of the permanent set, are blended together more completely than any other examples I have seen. On the anterior face is a slight groove between the upper half of the crowns; below and down to the necks all indication of division is lost. On the posterior surface is a spiculum of enamel projecting from the line of union. As the teeth are still in the mouth, I have had no opportunity of examining their fangs. I beg to exhibit to the Society a plaster cast taken of the teeth.

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POSTSCRIPT, *Aug.* 1852.—Since the above has been in type, I have found other instances of dental union. Rhodigius mentions instances of this condition. (*Lecton. Antiqu.*, 1517.) Haller also enumerates examples of it. (*Elem. Physiol.*, vol. vi.) Otto mentions an instance of two incisors united together by their crowns; and another where two molars were adherent by their fangs; another where three incisors of a child were united by their roots. (*Anat. Pathol.*, 1829.) In the Museum of the Royal College of Surgeons (*Prep.* 146) is a molar tooth of the upper jaw ankylosed to the adjoining one, which is inverted. Preparation No. 265 exhibits two united incisors; and No. 266 two tusks of a young elephant on the same side of the jaw, united throughout, and the pulp cavities communicating laterally.









AN ACCOUNT OF  
TWO CASES OF INTESTINAL OBSTRUCTION,

IN WHICH

THE OPERATION FOR THE FORMATION OF AN ARTIFICIAL ANUS WAS  
PERFORMED; ONE IN THE ASCENDING, THE OTHER IN THE  
DESCENDING COLON.

BY

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COMMUNICATED BY

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THE FORMATION OF AN ARTIFICIAL ANUS IN THE  
ASCENDING COLON.

CASE I.—On the 8th of October, 1841, I visited Mrs. Gough, a patient of Mr. Dovaston of Llandrinis. She was 47 years of age, and was labouring under many of the symptoms usually attendant upon strangulated hernia. The abdomen was greatly distended, but not very tender; there were distressing hiccough and almost incessant vomiting, which for two preceding days had been of a feculent nature. The pulse was small, rapid, and fluttering, and the countenance expressive of great anxiety.

I ascertained that no evacuation had taken place from the bowels for fourteen days; that the usual purgative medicines had been prescribed, and enemas freely administered without any beneficial result. In the absence of Mr. Dovaston I directed a drop of croton oil to be given every two hours, and the administration of turpentine enemas.

On Sunday the 10th, I was again required to meet Mr.

Dovaston. I found all the symptoms aggravated. The croton oil pills had been instantly rejected, and the enemas returned unaccompanied with any feculent matter.

I learned from the patient's friends that during the past seven or eight years she suffered greatly from constipation of the bowels; frequently passing a week without any evacuation, which only then could be procured by the use of some drastic purgative.

I carefully examined all the parts likely to be the seat of hernia, and also the rectum, which freely admitted O'Beirne's tube to the extent of fourteen inches. A large quantity of tepid water was injected, but it returned almost colourless; and as the patient was able to retain several pints, for some time I concluded that the cause of obstruction was not in the descending part of the colon.

The vomiting had been very distressing since Friday night. If only a table-spoonful of beef-tea was swallowed, it was almost instantly rejected with double the quantity of liquid feculent matter. The abdomen was enormously distended; the hiccough very frequent; and the state of the pulse indicated the case as being nearly hopeless. Under these circumstances I suggested to Mr. Dovaston the propriety of affording the patient a chance for her life by making an artificial anus in the loin. The nature of the operation was fairly explained to her, with no concealment of the great uncertainty of its success. It was offered as a last resource, and freely accepted.

On carefully percussing the abdomen, I found that it yielded a clear tympanitic sound over its whole surface, except on the right inguinal and iliac regions. Here the sound was dull. When comparing the two sides of the belly, the right was evidently fuller and more distended than the left; and this difference was more apparent in the right lumbar region than the left.

The preparations for the operation being completed, the patient was made to lie on her belly, a firm cushion being placed underneath it. I made a free incision through the integument midway between the last rib and the crest of

the ilium, commencing close to the spine, and terminating it in a line forwards with the anterior-superior spinous process of the ilium. I next divided the sacro-lumbalis and longissimus dorsi muscle, and part of the fibres of the quadratus lumborum. A quantity of fat and loose cellular tissue then presented, through which I carefully worked my way with the fore-finger and handle of the scalpel. This loose cellular and adipose tissue surrounds the kidney and intervenes between it and the peritoneal covering of the large intestine. By working downwards in the direction of the transverse processes of the spine, I kept clear of the peritoneum; and at a great depth in the wound I felt the right lumbar colon very tense, and offering a firm resistance to the pressure of the finger.

Before venturing to make an incision into the intestine, I was desirous of securing it by means of ligatures, and this part of the operation I found to be most difficult, in consequence of the great depth of the wound, and the want of needles with an acute angle. I however at length succeeded in transfixing the coats of the colon with two needles armed with a double ligature, and I then made a free incision into the intestine in a vertical direction. Out rushed a quantity of flatus and liquid feces. In a few minutes we collected two large basinsful of the latter, mixed with a considerable quantity of scybala. Although the inverted peristaltic action had gone on for so many days previous to the performance of the operation, and the vomiting had continued with scarcely any intermission, the presence of castor oil (large and repeated doses of which the patient had taken,) was quite evident in the discharge through the artificial opening.

The relief experienced by the patient was most decided and immediate. In the course of a quarter of an hour the tension of the abdomen had much diminished; the hiccough ceased; and, after several pints of feculent matter had been evacuated, the discharge gradually abated. I then drew the intestine more forward with the ligatures, and having passed the needles deep in the lips of the external wound, I secured

the opening in the colon in a manner most favorable to admit the free escape of its contents. A large poultice of linseed meal was applied to the external wound, and the patient was placed in bed, and ordered to lie on her right side. She became faint and exhausted; but after taking a little brandy and water the pulse rallied.

*Tuesday the 12th.*—On visiting the patient I was gratified to find the progress of the case as satisfactory as possible. Since Sunday evening there has been no vomiting, hiccough, or pain in the abdomen. The discharge through the artificial anus has been most abundant, and the tension of the abdomen has nearly subsided. There is no tenderness on pressure, and the pulse, though small and feeble, beats no more than 90. An enema was administered this morning, and brought away two very small scybalæ, which were coated with a putty-like substance. The patient complains of great soreness in the wound, the edges of which are much inflamed, and the bottom shows a disposition to slough.

Ordered good beef-tea; the poultice to be changed frequently, and a large enema to be given night and morning.

*Friday the 15th.*—I again visited the patient. She has had no unfavorable symptom until this morning, when a return of the vomiting occurred, and there is considerable tenderness over the whole right side of the abdomen. Pulse 86, rather jerking. Tongue much furred. I ascertained that since Wednesday evening the discharge through the artificial anus has been very scanty, and not a particle of feculent matter returned with the enemata, which have been regularly administered every night and morning.

On examining the wound I found the ligatures quite firm. There was a thick slough, like a piece of moistened brown paper, filling up the bottom of the wound. This I pressed on one side, and gave exit to a considerable quantity of feces.

Ordered thirty leeches to be applied to the abdomen, and two grains of calomel with a quarter of a grain of opium to be given every three hours.

*Wednesday the 20th.*—The progress of the case since last Friday has been most propitious. The tenderness of the abdomen soon subsided. The discharge through the artificial anus has been copious, but not the slightest particle of feculent matter has returned with the enemas. On examining the wound I found that the slough had separated, leaving a clear granulating surface at the sides. The ligatures were becoming loose; but as they did not appear to produce much irritation they were allowed to remain. The calomel and opium had been discontinued by the direction of Mr. Dovaston, and the only medicine taken since Monday was a small quantity of castor oil. Pulse 80. Tongue quite clean.

I did not visit Mrs. Gough again until *Tuesday the 2d of November*, when I found her sitting up and most grateful for her recovery. The ligatures had separated on the fifteenth day after the operation, and the whole length of the incision, excepting the part corresponding with the opening into the colon, was cicatrised. By the advice of Mr. Dovaston, the use of enemas had been persisted in night and morning; but they failed in bringing away even the smallest portion of feces: and the patient told me she was convinced that no flatus had passed downwards since the operation had been performed. She had taken a dose of castor oil every other morning since my last visit, which produced a copious evacuation through the artificial anus.

I provided the patient with a short tube of elastic gum, which I directed her to wear in the artificial anus, and to remove whenever she feels an inclination to evacuate the bowels.

In six weeks from the day of the operation the patient walked the distance of a mile, and declared herself better in health than for many years past.

The most remarkable part of the history of this case remains to be told. At the end of six weeks from the performance of the operation, the discharge of feces began gradually to decrease, although the patient continued taking castor oil. She was troubled greatly with flatulence, and

occasionally with sharp lancinating pains through her abdomen. At the end of seven weeks the vomiting returned, accompanied with severe colicky pains. For two days there had been scarcely any discharge through the artificial anus, and that was of a very liquid kind. The patient declared her belief that there was some obstruction at the bottom of the opening. A messenger was dispatched for Mr. Dovaston; but before his arrival at the patient's house, she had experienced a sudden and effectual relief. A hard substance had shot out from the artificial anus, which, on examination, was found to consist of five plum stones firmly agglutinated to each other. These were followed by sixteen other single plum stones, and afterwards by a very copious feculent evacuation. On the following day three more stones found an exit, accompanied with two small bones, belonging, as I should conjecture, to the pinion of a duck.

Nine months after the operation, the patient, with the exception of the local inconvenience, has no interruption to perfect health. Every week she takes castor oil, which expels one or two plum stones. The number now collected amounts to eighty-six. She has given up the use of the enemata for some weeks, as they failed to produce any good effect; and she is confident that not even flatus has passed the rectum since the operation was performed.

The progress of the case, until within six weeks of the patient's death, presented no features of particular interest or importance. At irregular intervals, other plum-stones were discharged; and the total number collected was one hundred and sixteen.

By taking simple aperient pills, and an occasional dose of castor oil, the discharge through the artificial anus was free, and scarcely emitted any feculent odour. This circumstance went very far to reconcile the patient, and made her condition less loathsome and repugnant to feelings of female delicacy. The elastic tube had not been worn during the last year of the patient's life, the artificial anus being perfectly patent, and having no disposition to contract.

Within three months of her death, the patient was in the

enjoyment of tolerable health. She could daily walk a considerable distance and attend to her usual domestic affairs. The last time I saw her in Shrewsbury was in July, 1844, when she complained of loss of appetite and general debility. She had become much thinner, suffered greatly from flatulence, and required more frequent doses of aperient medicine. I had no opportunity of visiting her until nine days before her death, when I found her in a sinking state. She had then kept her bed about a fortnight; had taken but little sustenance; had no evacuation for many days, and at first obstinately refused all medicine. She was at length prevailed upon to take a few doses of an aperient mixture, which acted freely, and the discharge through the artificial anus occurred daily up to the 14th of October, when the patient died, having lived three years from the time the operation was performed.

The body was examined on the day after death. Externally there was nothing worthy of observation but the extremely firm state of the cicatrix of the wound. The opening of the artificial anus was plugged up with feculent matter. The abdomen was slightly distended, and the whole body much emaciated.

On opening the abdominal cavity, the omentum was found remarkably thin, almost all trace of adipose substance being removed, leaving only a thin semi-transparent membrane. The cæcum and ascending colon were enormously distended.

I commenced tracing the intestinal canal from the duodenum to the cæcum, passing inch by inch through my fingers. The whole line was perfectly empty. There was no trace of disease or even adhesions until arriving at the termination of the ileon, where three membranous bands were discovered running in a lateral direction, and connecting that portion of the small intestines with the cæcum and ascending colon.

The cæcum itself and the ascending part of the arch of the colon appeared of unusual size, until it was suddenly cut short at the *transverse* part of the arch, by the intervention

of the most rigid stricture I ever felt. If a piece of whipcord had been firmly tied round this part of the intestine, the occlusion would not have been more complete than was effected by this organic change. The whole remaining portion of the transverse arch of the colon, its descending part, and the sigmoid flexure, were collapsed, and formed a thin flaccid tube.

The absence of all traces of inflammatory action in the peritoneum was very remarkable. There was no thickening, no adhesions (with the exception of the three membranous bands alluded to), or deposition of lymph. On making an incision into the intestine, between the strictured part and the caput coli, the muscular coat presented the appearance of the columnæ carneæ of the heart, throughout the whole length of the cæcum and colon up to the stricture being very firm and fleshy. This appearance of the inner surface of the colon anterior to the stricture was like what is seen in the thickened condition of the bladder in cases of obstinate and long-continued stricture of the urethra.

The stricture itself was of cartilaginous hardness, and the closing of the canal so complete that it would not admit the passage of even a bristle. The extent of the stricture was not quite a quarter of an inch, of a white, pearly appearance, perfectly smooth, and having no more apparent vascularity than a tendon.

The peritoneal lining of the abdomen was quite perfect, and I was surprised to find so little thickening in the neighbourhood of the part where the artificial anus was established. The opening forming the artificial anus was in the *posterior* part of the intestine, about an inch above the valve. The length of the opening was barely one inch. Considerable deposition of lymph was found around the posterior part of the intestine, by which it was rendered firmly adherent to the deepest part of the cicatrix of the external wound. The meso-colon or duplicature of the peritoneum covering the intestine in this situation must have been separated by the great distension of the bowel, so as to allow me to open it posteriorly, without a breach of the peritoneum

itself. The other abdominal viscera were healthy. No examination of the head or chest was allowed.

I believe this operation was the first performed in England according to the directions of Mons. Amussat. Mr. Teale, of Leeds, performed the second: and the late Mr. Jukes, of Birmingham, the third. The detail of Mr. Jukes's case is worthy of careful perusal; and the one which I have now related proves beyond doubt the practicability of opening the *ascending* colon, without a breach of the investing peritoneal lining of the abdomen.

M. Amussat, to whom we are indebted for the revival of this operation, discusses, in a paper read before the Royal Academy of Medicine in Paris, the anatomical relations of the lumbar regions, and their connections with the corresponding portions of the colon. Speaking of the left colon, he says—"We find, upon attentive examination, that the intestine is destitute of peritoneum, in at least its *posterior* third, being here surrounded by a cellular coating, continuous with that which lies upon the outer surface of the serous membrane. The three bands of longitudinal fibres may, in the lumbar colons, be described as anterior, internal, and external; and, by measuring the space between the two latter fasciculi, we may ascertain the dimensions of the part uncovered by peritoneum, since they point out the lines at which this membrane is reflected from the bowel upon the walls of the belly."

With regard to the right colon, M. Amussat reports that he has never yet found a lumbar meso-colon, although, when the intestine was contracted, the interval between the two folds of the peritoneum has been sometimes very small. At the same time he observes, that whilst the ascending colon acquires from this arrangement a greater degree of mobility than the descending, he has never yet found it possessed of a mesentery so perfect as to render it floative in the abdominal cavity. Admitting, therefore, that this objection may be urged against an attempt to perforate the right colon when empty, it will not necessarily constitute a sound argument against such an operation when the bowel is distended.

Although we have in many instances seen the peritoneal cavity freely laid open for the removal of large ovarian tumours with no dangerous results, I apprehend that in the performance of this operation for artificial anus it is of the greatest importance to avoid a breach of the investing serous membrane. The wound is of necessity very deep, and in a part where sloughing, to some extent, is almost sure to take place, and any infiltration of feculent fluid within the abdominal cavity would cause inflammation and fatal consequences.

In performing the operation I should always advise two ligatures to be passed through the coats of the intestine, leaving a sufficient space between them for a free vertical incision. With the two ligatures the intestine should be drawn upwards, as close as possible to the lips of the external wound, before the knife is plunged into the bowel.

#### THE FORMATION OF AN ARTIFICIAL ANUS IN THE DESCENDING COLON.

CASE II.—Joseph Ward, æt. 43, was a man of very stout and muscular frame, with a florid complexion. He was more temperate than the generality of his class, being the driver of a mail coach, which occupation he had followed for many years.

I was first consulted by him on January 20, 1847. He complained of troublesome constipation and occasional pain in the loins. Several hæmorrhoids projected externally, and there had been for some time past a slight discharge of blood after every evacuation.

I directed him to abstain altogether from taking spirits, and prescribed some simple laxatives, and the occasional application of leeches to the anus. I also advised an enema two or three times during the week, if the aperient medicine did not act satisfactorily.

I saw him again on the 14th of March, when he informed me that since I had last prescribed for him his bowels had become more obstinately constipated than ever. A week

had often been passed without his having had any evacuation.

The case now assuming a more serious aspect, I urged upon him the necessity of giving up his work and placing himself under regular treatment.

I was desired to visit him on the 21st of March, and found him complaining of great pain in the loins. He had a severe rigor in the night. Pulse 100. Tongue much furred. No vomiting; but flatulence to an excessive degree. Had no evacuation from the bowels for four days. I ordered him to be cupped on the loins, to take ten grains of calomel and an ounce of compound senna mixture every two hours.

On visiting the patient next day I found him much relieved. The bowels had acted after six ounces of the compound senna mixture had been taken. I prescribed alterative doses of blue pill, to be taken at bedtime every night, and an aperient mixture three times daily.

From the 22d of March to the 2d of April nothing particular occurred. The bowels had acted a little daily; and, with the exception of a dull sense of uneasiness in the loins, the patient had not much to complain of.

On this day, the 2d of April, there was a recurrence of the rigor, followed by excessive heat and vomiting. There was no abdominal tenderness; but the bowels had not acted for twenty-four hours. Similar treatment was adopted as on the former occasion; but the vomiting continued in an obstinate degree, and, after a variety of purgative medicines had been taken, a small flattened fecal evacuation came away with an enema that was administered on the 5th.

On this day, the 5th of April, I first examined the rectum. I could detect nothing wrong within reach of the finger. I then introduced a full-sized bougie, but could not pass it beyond the distance of six inches. No doubt now existed as to the seat of obstruction; and on the following day I endeavoured to overcome it by using a variety of rectum bougies, but failed to introduce the smallest beyond six inches and a half. I then tried a full-sized elastic gum

urethra bougie, and this evidently passed beyond the obstruction, for on withdrawing it a great discharge of flatus took place, followed by liquid feculent matter.

Considerable constitutional disturbance was the result of this attempt; and although the patient, by excessive straining, discharged small quantities of liquid fæces, his condition was gradually becoming more alarming.

On the 12th I again made another careful attempt with the bougie, but the pressure of its point against the obstructing part caused such acute pain, and being followed by slight hæmorrhage, I desisted from further interference. In the evening the patient was seized with a severe rigor and vomiting. Great tenderness of the abdomen supervened. Blood was taken from the arm; leeches applied freely all over the belly; and calomel and opium given every three hours.

In four days the inflammatory symptoms had subsided; the tenderness was entirely removed, but the vomiting continued, and only one slight discharge from the bowels had taken place between the 12th and the 21st of the month.

The greatest attention was paid to the diet, and the irritability of the stomach was relieved for a short time by occasional doses of prussic acid.

Between the 21st of April and the 4th of May, only three small liquid evacuations were produced, and these were attributed to the effect of repeated doses of the inspissated ox gall, suggested as a most useful remedy by my friend Mr. Heatheote, surgeon of this town. The ox gall was the only aperient taken that did not seem to increase the vomiting.

On the 12th of May, after excessive straining, the patient passed by the rectum three small fleshy substances of a placenta-like appearance, accompanied with some hæmorrhage, and a little liquid feculent matter. This was the last time any fæces passed by the rectum. I again examined the rectum with the finger, and found that I could just reach some morbid growth, which certainly was not tangible on the 5th of April.

The condition of the patient during the remaining month of May was most distressing. He was harassed with constant hiccough, vomiting, and tenesmus. At times the straining was so great that blood escaped from the anus. The abdomen gradually became more distended, but was free from tenderness. As no relief could be expected from medicine, the vomiting becoming more constant, and the tension of the abdomen daily increasing, I proposed, on the 30th of the month, as a last resource, the formation of an artificial anus. The patient firmly declined submitting to the operation, and requested to have nothing given to him but opium.

From the 1st of June to the 18th he lived entirely upon small quantities of beef-tea, brandy, and soda water, and large doses of *Liq. Opii Sedativus*.

This day, the 18th, for the first time feculent matter in large quantities was vomited; and on visiting the patient in the evening he told me if the fæculent vomiting continued he would submit to any operation. The 19th passed with only the ordinary kind of vomiting. The 20th brought a recurrence of the fæculent vomiting to a considerable amount, and then the patient earnestly requested to have the operation performed. The rectum was again examined with the finger, and the morbid growth was found to be much lower down. It entirely filled up the hollow of the sacrum, was spongy to the touch, and on withdrawing the finger it was covered with a bloody serum, which, however, had no unpleasant odour.

On the *21st of June*, at one o'clock, the operation was performed in the presence of many of my professional friends. The stercoraceous vomiting had continued all the morning. The abdomen exceeded in size any that I have ever before or since seen. This enormous distension was not surprising when it is borne in mind that not a particle of feculent matter had passed the rectum from the 12th of May up to the 21st of June, a period of more than five weeks. Pulse 120, very feeble. Countenance anxious and contracted.

The incision was made as in the former case, midway

between the last rib and the crest of the ilium, but on the *left* side, commencing about an inch from the spine.

The patient, although now much reduced in flesh, had been a very powerful muscular man; and I made a much longer incision than in Mrs. Gough's case, as I knew there would be a greater depth of parts to cut through. In dividing the muscles one vessel bled rather profusely, and some time was lost in the endeavour to secure it. After the division of the muscular fibres I came down upon loose cellular and adipose tissue. Pressing this aside I forced my finger deep in the direction of the transverse processes of the spine, and then felt the lumbar colon, but not so tense and resisting as in Mrs. Gough's case.

After clearing away the adipose substance, making the surface of the intestine more exposed, I passed two needles armed with silk ligatures through its coats, drew the bowel upwards, and then made a free incision into it in a vertical direction between the two ligatures. I was disappointed when only flatus escaped freely;—no *feces* passed. By drawing the intestine upwards with the two ligatures, although the wound was a very deep one, I was able to reach the opening in the gut with my fore-finger, and felt satisfied that it was sufficiently large to admit the passage of *feces*. Moderate pressure was made on the abdomen in the direction of the descending colon, but only flatus escaped from the wound; and after waiting some time, the patient was placed in bed on his left side, greatly exhausted by the severity of a protracted operation.

I feared that as no *feces* escaped, the disease had extended above the part of the colon opened, and that the patient would not derive even temporary relief from the operation. Yet the part of the bowel opened seemed to be free from any thickening or disease.

I visited the patient at five o'clock in the evening, and found no improvement in any of the symptoms. The vomiting and hiccough returned. There had been no discharge of *feces* through the wound, but flatus had occasionally passed.

At nine o'clock I again visited him, and was much

gratified to find an unlooked for improvement. About half an hour previous to this visit, he desired to have some soda water, which he drank freely. Immediately after he felt griping pains; flatus first passed through the wound, then an immense quantity of liquid fæces. The nurse had collected nearly a gallon, and it was still pumping out freely through the artificial anus.

*June 22d, 10 o'clock, A.M.*—There is a decided alteration in the expression of the patient's countenance. Since twelve o'clock last night he has only vomited twice. He has had no sleep in consequence of the constant escape of feculent matter from the wound. The abdomen is reduced in size, but is tender on pressure, particularly on the left side. Pulse 106. He has made no water since the operation. The catheter was used, and more than a pint of high-coloured urine drawn off. Ordered a grain and half of calomel and a quarter of a grain of opium every four hours. Beef-tea and soda water.

*7 o'clock, P.M.*—Vomited twice since morning, ejecting the beef-tea and soda water, but no stercoraceous matter. Up to four o'clock this evening the discharge of liquid fæces through the artificial anus was unceasing, but it had now stopped. The tension of the abdomen less. As no urine had been passed, the catheter was again used.

*23d, 10 o'clock, A.M.*—Has had no vomiting or hiccough during the night. Slept four hours, and was then disturbed by the passing of fæces and flatus through the wound. Pulse 96. The abdomen much reduced in size, but very tender over all the left side. Ordered leeches to be applied. The catheter was again used. Urine less high coloured. To continue the calomel and opium. Beef-tea and soda water.

*9 o'clock, P.M.*—Vomited once this morning after drinking off at one draught a bottle of soda water. Great thirst. Tongue much furred. Pulse 105. Several pints of fæces escaped during the day. The catheter again required. Ordered the dose of opium to be diminished, and gave particular directions that only very small quantities of liquid should be taken at a time.

24th, 10 o'clock, A.M.—Passed a good night. No sickness or vomiting. Tension of the abdomen much subsided. Less tenderness. Free discharge of healthy fæculent matter through the wound early this morning. Pulse 90. Tongue cleaner. Used the catheter; urine paler. To continue the calomel and opium every eight hours.

9 o'clock, P.M.—Pulse 95. No sickness. Free discharge of flatus and fæces through the wound at intervals during the day. Used the catheter again. As the gums are now affected, ordered the calomel to be discontinued. He can bear pressure now over every part of the abdomen. My attention was directed to an enlarged gland in the left groin, which was very tender and painful. Wound looks remarkably well; but the integuments covering the sacrum and left hip are very red and sore.

25th, 8 o'clock, A.M.—Has passed upon the whole a comfortable night. Slept several hours, but this morning is much troubled with flatulence and acidity of stomach. Ordered a mixture with calcined magnesia and peppermint water. Passed the catheter. Urine less high coloured. Pulse 90. No tenderness of the abdomen, which is reduced almost to its natural size.

8 o'clock, P.M.—Going on well. No sickness. Large quantity of fæces passed through the artificial anus since morning. The flatulence has ceased. Patient says he feels better now than at any time since the operation. Has passed a little urine; but as the bladder felt rather distended the catheter was again used.

26th, 8 o'clock, A.M.—Has passed a good night, and before my visit this morning, made water freely, and also discharged fæces through the wound. The wound looks healthy, but sloughing of the integument covering the sacrum has commenced.

27th, 8 o'clock, A.M.—Passed a very restless night. Suffered much from the soreness of the sacrum, and pain in the left groin, which is much enlarged. This morning the abdomen feels more distended, although there has been no want of discharge through the wound. Pulse 96, and weak. Patient

is low and desponding. He was ordered to take good beef-tea and a little brandy and water.

9 o'clock, P.M.—Is more comfortable. Pulse 90. Free from sickness, and complains only of occasional shooting pains through the left groin.

28th, 8 o'clock, A.M.—Has had little sleep, but is in better spirits this morning. Dressed the wound, which looks healthy, and removed the ligatures. No tension or tenderness of the abdomen. Made water freely, and passed a large quantity of fæces through the artificial anus. The sloughs of the parts covering the hip and sacrum begin to separate.

29th, 10 o'clock, A.M.—Is cheerful this morning, having passed an excellent night, undisturbed by flatulence or the escape of fæces through the wound. After breakfast he parted with flatus and feculent matter, and was then placed on a water-bed. He expressed a desire to eat a little boiled mutton for dinner, and for the first time he was allowed to take any solid food since the operation.

July 8th.—From the last report up to the present time, the patient has progressed favorably, and as no untoward symptoms arose, I have not inserted the daily account from my note-book. Every day the discharge of fæces through the wound was in moderate quantity, and there was no return of vomiting or pain in the abdomen. This morning he was seized with acute pain in the left side of the belly, and had during the night a slight shivering fit. The enlargement in the left groin has much increased, and this morning an indurated gland in the right groin is perceptible. As the patient complained of some difficulty in emptying the bladder, the catheter was again introduced, but not more than a quarter of a pint of urine was drawn off. The application of leeches to the left side of the abdomen, and suspending the use of all stimulants, constituted the treatment adopted for three or four days. The pulse was increased in frequency. The urine very high coloured, and emitting a most offensive odour. It was now too evident that the disease was operating most unfavorably on the vital powers.

The glandular affection of both groins rapidly increased ; the difficulty of emptying the bladder was so great that the use of the catheter was required every night and morning. In addition to these untoward symptoms, the sloughs over the sacrum and hip gradually extended, notwithstanding all pressure was carefully removed by means of the water-bed. On this day I passed my finger again into the rectum, and found that the tumour had descended close to the sphincter, and completely filled up the canal. The pressure produced by the morbid growth accounted for the difficulty in emptying the bladder.

It was satisfactory to know that, up to the day of the patient's death, no return of vomiting occurred, and no interruption to the daily passage of fæces through the artificial anus. The enlargement in each groin rapidly increased ; that of the left assumed a livid appearance, and ulceration of the surface took place three days before the patient's death. The tumour also projected through the sphincter ani, and attained the size of a small orange. In substance it was rather firmer than the placenta ; it was not sensible to the touch, but bled on the slightest fingering. The wound had almost healed, excepting at the part corresponding with the opening into the colon.

Although the patient was rapidly sinking, and suffering from the painful state of the sloughing wounds, he frequently expressed his gratitude for being relieved of what he termed "that horrible throwing up of the stools."

I endeavoured to alleviate his sufferings by repeated doses of opium, and the last week of his existence was one of comparative ease. The appetite gradually diminished. The pulse became weaker and fluttering. No delirium took place, but the patient retained his consciousness to the last ; and expired on the 26th of July, having lived one month and five days after the performance of the operation. No examination of the body took place.

A CASE OF  
INTESTINAL OBSTRUCTION  
FROM  
DISEASE OF THE RECTUM,

TREATED SUCCESSFULLY BY OPENING THE DESCENDING COLON IN  
THE LEFT LOIN.

BY  
ALFRED BAKER,  
SURGEON TO THE GENERAL HOSPITAL, BIRMINGHAM.

COMMUNICATED BY  
JOSEPH HODGSON, Esq., F.R.S., PRESIDENT.

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Received Feb. 2d.—Read Feb. 10th, 1852.

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ON the 15th of August, 1849, I was requested to visit Mrs. T—, a rather tall, spare woman, in the sixty-second year of her age, who was suffering from severe pain in the umbilical and hypogastric regions, with frequent retching and some vomiting. She had also a sense of fulness in the abdomen, flatulence, and constipation, with loaded tongue, but no peritoneal tenderness or fever. I learned that she had been eating indigestible food, and attributed the attack to that cause. She took a dose of calomel with opium, followed at intervals by a magnesian aperient draught, and had an antispasmodic and laxative enema. The sickness ceased, and the bowels were speedily and freely relieved; but the pain, to a less extent, recurred occasionally, and she had symptoms of indigestion for a few days, which were removed by nightly doses of compound extract of colocynth with conium, and a stomachic draught taken between meals.

On the 1st of October, 1849, I was again called to her, and found her labouring under an attack of a similar kind, which was not referable to any obvious cause. On this occasion I found the abdomen swollen and tympanitic, with slight tenderness on pressure in the left iliac region. She had a femoral hernia on the left side, of the size of a small orange, which was tense and somewhat tender, but which was reduced by perseverance in the use of the taxis. She was kept in bed until a truss was procured; took a dose of castor oil, and fomentations were applied to the belly. On the 11th of October she had a return of the former symptoms, and it was now discovered that she had also a femoral hernia on the right side, which had become incarcerated, and which was reduced by the taxis. She had on this occasion so much pain, that it was necessary to give her two or three doses of opium, to foment the abdomen, and to relieve the bowels by aromatic aperients. A double truss was now applied; and, having directed her to regulate her bowels by castor oil or compound rhubarb pills, my attendance upon that occasion ceased.

On the 9th of November in the same year I was again summoned, and found many of the signs of intestinal obstruction present. Her pulse was tranquil, her skin cool, and her tongue thinly furred. Her bowels had been scantily moved on the previous day, but not thoroughly for several days. She had much and constant abdominal pain, although this varied in intensity. The belly was distended, and somewhat tender on deep pressure; she had nausea and retching, but no actual vomiting. Micturition was frequent; the urine scanty and loaded; and she had deep-seated pain in the sacrum, with an intermittent forcing sensation, or bearing down, in the rectum. I found that, within reach of the tip of the finger, the bowel was obstructed by a firm growth, occupying its whole circumference: this had an uneven surface, and a dense consistence; near its centre was a small fossa, which appeared to be the lower orifice of the contracted portion of the canal. I attempted to dilate this opening with the finger, but its distance from the anus

rendered this proceeding useless, and the slightest pressure from below pushed the strictured part upwards. The uterus was quite healthy, and could be moved independently of the diseased bowel. As the stricture did not seem to produce complete occlusion, she was ordered to take two pills every fourth hour, composed of five grains compound extract of colocynth and five grains of extract of conium; and an enema was given with the ordinary syringe, in the hope that some of it would pass through the contracted canal, and thus liquefy the accumulation above. Next day, finding that the enema had been expelled, after a few minutes' retention, without any feces, and that the symptoms were unabated, I attempted to pass a small œsophagus-tube, and succeeded in penetrating the stricture for a short distance, but could not get through it; some fluid was, however, injected along the tube, all of which did not return. On the following day, finding that a little dark-coloured liquid stool had been voided, the tube was again tried; and a quarter of a drop of croton oil was added to each dose of the pills. By perseverance in this treatment, the bowels were, after two or three days, partially unloaded; and I hoped that time would now be gained for the dilatation of the stricture, with which object bougies of small size were employed, but with only a small amount of success. In a few days constipation returned, accompanied by symptoms of peritoneal inflammation. Her pulse rose to 100, she had loss of appetite, thirst, dry tongue, heat of skin, with short and hurried breathing. The abdomen, which had been softer and smaller, again became tense, tumid, and tender, and her suffering was increased by very slight pressure upon it. She now took two grains of calomel with the fourth of a grain of opium every four hours; croton oil liniment was rubbed freely over the abdomen, and hot fomentations were assiduously applied. Under these measures she improved; the symptoms of peritonitis disappeared, the size of the abdomen was lessened, and diarrhœa shortly came on. The diarrhœa was not controlled by any astringent, but in a few days spontaneously subsided.

As was anticipated, however, the constipation again became troublesome, and an examination of the rectum showed that there was now a more complete closure of the canal in the part diseased than existed prior to the attack of purging. There was as yet no vomiting. She was directed to take colocynth and hemlock pills; and bougies and catheters, flexible and metallic, the latter having their curves altered, were employed in endeavours, which were only occasionally successful, to pass through the stricture and to draw off the contents of the bowel. In this state she passed the latter part of November, the whole of December, 1849, and the early days of January, 1850, the relief produced by occasional faecal discharges—sometimes spontaneously, sometimes artificially, induced—being sufficient to avert the distressing effects of perfect obstruction. During this period my friend, Dr. Bell Fletcher, saw the patient with me on several occasions, and aided me by his valuable advice.

On the 17th of January her state became much aggravated. The stricture of the rectum produced complete occlusion; every attempt to penetrate it by the instruments formerly used was unsuccessful; inverted action of the stomach and bowels came on; her pulse rose, and her condition became so perilous and urgent, that on the evening of the 23d of January, 1850, she requested me to perform the operation which was proposed for her relief. Her state then was as follows: countenance pale, sunken, and anxious; breathing short and hurried; skin cool and clammy; pulse 120, small, and compressible; tongue ash-coloured and moist; constant pain in the abdomen, with distressing sense of tension, both increased in violence occasionally; continual vomiting of a brownish fluid, which, for the last two days, has had an undoubted faecal odour and appearance; has passed no alvine evacuation whatever for five days, although she has been harassed with tenesmus and straining, by which a little mucus, sometimes tinged with blood, has been voided per anum. The abdomen is greatly distended, and the iliac and lumbar regions on both sides are dilated and bulge outwards. Pressure does not cause com-

plaints of tenderness, but induces immediate sickness. Percussion yields a tympanitic sound over the whole abdomen in front, but, as the patient lies on her back, the lower and under part of each lumbar region, especially the left, gives a dull resonance. When she is turned upon her face, the lumbar spaces are found to be widened laterally, and tumid; and when struck with the fingers, a clear sound is produced, from the solid contents of the colon having gravitated towards the front of the body.

At eight o'clock, P.M., January 23d, 1850, in the presence of Dr. Heslop, Mr. Hale, and Mr. James, I opened the descending colon in the left lumbar region, where it is not enveloped by the peritoneum. The patient being laid upon her face in bed, and her truss removed, lest it should interfere with the operation, an incision was made transversely across the left loin for five inches, commencing about two inches from the spine and carried outwards midway between the last rib and the crest of the ilium. By this the skin and subcutaneous cellular membrane were divided; after which the *latissimus dorsi*, *quadratus lumborum*, and the lumbar fascia, were in succession cut through. The loose fat, which in persons who are not very much emaciated always exists in this situation, projected at the bottom of the wound, and an attempt was made to push it aside, so as to allow the bowel to come forward; this proceeding, however, failed, and it was necessary to remove several large masses of fat by the knife before the colon became visible. At first the intestine did not project, and the finger was passed into the wound to ascertain the cause: the cellular connections of the colon with the loin were thus broken down, and, on the withdrawal of the finger, the intestine distinctly projected at the bottom of the wound, having a pale, leaden, and greenish hue. It was next attached by four sutures to the skin at the edges of the first incision, and was then opened by a scalpel to the extent of an inch between the threads. A rush of most offensive air took place immediately that the bowel was punctured, and a stream of chocolate-coloured feces, of the consistence of thin gruel,

welled up from the opening. This continued to flow until more than a large wash-hand basin had been filled, when it ceased. The wound was then covered with pledgets of linen dipped in warm water; a thickly-folded sheet was placed under the patient, and she was turned upon her back in bed, with an inclination towards the left side, so as to favour the escape of matters from the wound. She took a grain of opium immediately, and was supplied with small quantities of beef-tea, gruel, and milk. I should, perhaps, remark that chloroform was not administered in this case, on account of the vomiting, which continued even during the operation. There was very little bleeding, and no vessel required a ligature.

January 24th. Feels greatly relieved by the escape of stercoral matter through the wound. This has not been incessant, but has recurred about every half-hour through the night, and has been always preceded by pain in the bowels. Has had no sickness since the operation; has had some sleep, and has been able to take some liquid nutriment frequently. The expression of her face is still anxious, and she seems to be depressed by the frequent recurrence of colic-like pain. Her breathing is easier; her pulse 106, sharp, but stronger than yesterday; her skin is warm; her tongue whitish and moist; her abdomen is somewhat tender, though much lessened in size. She complains of smarting in the wound, which looks well, and is free from inflammatory action.

25th. Took a grain of opium again last night, and slept tolerably. The bowels act through the lumbar aperture about every hour, the approach of the evacuation being indicated by griping or pinching pain, accompanied by flatulent rumblings. The whole of the faecal accumulation has not yet been voided, but is escaping, mixed with fresh bilious secretion. To-day she had a scanty discharge per anum, composed chiefly of mucus, but having a little faecal matter mixed with it. Her pulse has fallen to 90, her tongue is cleaner, and her appetite is increased. The wound looks well.

26th. Is still progressing satisfactorily, and has a more tranquil expression of countenance. The abdomen has become soft, flaccid, and free from tenderness. The evacuations are diminishing in frequency; only three copious ones have been voided to-day, all of recent formation. Their escape was attended by much smarting in the wound. The surface of the divided parts has a greyish, sloughy appearance, and the portions of colon which form the artificial outlet are slightly tumid and congested. As her appetite is good, and there are no febrile or inflammatory symptoms, she is to take meat for dinner. The wound to be dressed with lint dipped in warm oil, and covered with a poultice.

27th. Has a pulse of 80; a cool skin, and a clean tongue; her urine is abundant, and voided at natural intervals. Has passed three soft ochre-coloured stools from the wound, and a small mucous evacuation by the rectum.

28th. She complains much of soreness and pain about the wound, the edges of which are tumid and the surface sloughy. The sutures attaching the bowel to the skin are producing some ulceration, and the parts immediately around the wound are red and irritable. The evacuations, of which she has had three by the artificial aperture and one by the anus, are still preceded by pain and rumbling, and are accompanied by a free escape of flatus. The wound is cleansed by means of a syringe with yeast and water, and afterwards dressed and poulticed as before. The surrounding skin is frequently and thickly smeared with cerate, softened by the addition of olive oil, in order to defend it from irritation.

29th. She feels less pain in the wound, which is cleaner. The cutaneous irritation is also somewhat relieved, and is greatest around the sutures, which, as they were causing ulceration in both the skin and colon, were removed. The bowels have acted in the usual way, *i. e.*, three faecal discharges from the wound and one mucous one from the rectum in twenty-four hours.

30th. Is cheerful and smiling; slept well; and has no complaint excepting an occasional pain in the abdomen,

which appears to arise from flatulence. She has passed a copious, soft stool by the lumbar opening. In the forenoon she had so much pain and bearing-down in the rectum, that, as she could not use the bed-pan, the nurse lifted her out of bed and placed her upon the night-chair, when she expelled, per anum, a little solid with some liquid stool. This, from its colour, was probably a portion of the old accumulation which had remained in the bowel below the artificial aperture, and had been since squeezed through the stricture. The wound is cleaner, and in parts seems disposed to granulate. The lips of the incision made in the colon are nearly an inch behind the integumentary margin of the wound.

31st. After my visit last night, she had much aching pain in the bowels, and a sense of smarting in the wound, succeeded by a very liquid stool from the loin. She took an opium pill, which gave her ease and sleep, and which seems also to have tranquillised the bowels. To-day only one scanty evacuation has been voided by the wound, and none by the anus. The surface of the wound is now clean, but its edges are tumid and faintly reddened. To be dressed with cerate spread upon lint.

Feb. 2d. Has passed two restless nights, her sleep being broken by pain in the belly. She looks consequently pale and depressed, but presents no other unfavorable symptom. After two discharges from the artificial outlet, she was this morning again seized with pain and forcing in the rectum, and expelled a little faecal matter from the anus. In the afternoon she had griping pain in the bowels, and twice voided some dark-coloured mucus from the rectum, besides two thin motions from the wound. To take a grain of opium if the pain is violent.

5th. This morning she took a dessert-spoonful of castor oil, which has given her several copious evacuations from the wound, and she is now easier. Her health improves, and the wound is going on favorably. There is no swelling of the surrounding parts; its dimensions are lessening, and healthy granulations are springing up from the bottom of the

wound, in the centre of which the everted lips of the incision in the colon project a little beyond the granulating surface.

8th. After the costiveness which has been noticed, she attempted to omit her grain of opium, which she had hitherto taken every night. She took it again last night, and had several hours' sound sleep. On each day she has had two or three evacuations by the wound, and one scanty discharge of mucus, sometimes mixed with faecal matter, from the anus, the latter being always preceded by tenesmus and painful sensations. The wound is healthy, and is still contracting. The passage of faecal matter over it now produces only very slight irritation.

15th. Since the last report she has had some irregularity in the action of the bowels, and has been compelled to take castor oil; the secretions are quite healthy. The wound is much smaller, partly from cicatrisation and partly from contraction. The lips of the intestinal orifice are now nearly on a level with the skin.

April 18th. From the last date the patient has not had one bad symptom. She got up in the third week after the operation. Her general health has been good, and her body is well nourished; indeed, I think her fatter than she was before the operation. Her bowels have been relieved regularly through the lumbar aperture, and she has had frequent, although not daily, discharges from the anus, consisting of from a tea- to a table-spoonful of mucus, sometimes streaked with blood, sometimes mixed with broken-down faeces. The wound now presents a pinkish cicatrix, with a small velvety projection in the centre, formed by the everted mucous edges of the aperture in the colon. This opening is large enough to admit the index finger easily. She has been in the habit of covering it with a little simple cerate spread upon lint, over which she has placed a fold or two of soft linen, and then has retained the whole in situ by a bandage. She has, thus guarded, gone about her house, attending to her domestic arrangements, and has experienced no other inconvenience from the artificial anus, than the

occasional and involuntary escape of flatus. As to the faecal discharges, she has rarely any annoyance from them, being forewarned of their approach by slight aching in the belly, and a sort of rolling movement of the bowels, followed by a sense of fulness and distension of the loin, "as though," to use her own words, "something was gathering up there." Within the last few weeks, since the healing of the wound leading to the opening in the bowel, the cutaneous edge of the aperture has, like all newly-formed parts, exhibited a tendency to contraction; and on this account, as well as for the purpose of preventing gaseous and other escapes, I contrived and caused to be made an instrument by which the artificial anus might be closed, and at the same time the further contraction of the cicatrix might be prevented. This apparatus comprises a plug, a shield, and a strap. The plug or nipple is of ivory, smoothly turned, and of a somewhat bulbous form; it projects from a flattened base of the same material, which is attached to a steel plate moulded to the shape of the loin, of which a model was first made to ensure accuracy of adaptation. The inner surface of this plate is lined with a thick layer of vulcanised india-rubber; to its posterior edge is attached a softly-padded leathern strap, which is then carried round the abdomen, and is fastened to buckles on the anterior edge of the shield, so as to retain the instrument in situ. The bulbous nipple introduced into the aperture closes it effectually, and is from its shape little liable to displacement; whilst the abdominal strap fixes the apparatus like a truss, and prevents any derangement of it during the movements of the body. Since its application she has constantly taken exercise out of doors by walking and riding.

Shortly after my last note my patient complained so much of pressure made by the shield upon the crest of the ilium, that, after an ineffectual trial to relieve it by extra-padding on its inner surface, I had the metal plate removed, retaining only the india-rubber, which, being soft and pliable, she has worn ever since without complaint. She has on several occasions had great difficulty in introducing the plug into

the artificial orifice, and at these times upon inserting my finger into the aperture, it was so grasped by the contracted cutaneous margin around the opening into the bowels, as to resemble the sensation produced by having the finger tightly constricted by twine or whipcord. The obstruction to the introduction of the instrument was relieved by warm fomentations, by ceasing to wear the instrument for a day or two, and then resuming it for part of the day. The return of the plug was, however, always preceded by the introduction of a bougie, which, from its length, was more manageable, and could be inserted with greater ease by the patient.

She has continued in this state, and has now (Jan. 1, 1852,) remained perfectly free from all symptoms of intestinal obstruction since the operation, *a period of two years*, and, until about three months ago, she may be said to have been in the enjoyment of perfect health. She has been able to go through any exertion demanded of her: upwards of twelve months ago, she walked a distance of fully four miles to be present at a surgical operation performed upon her son. About three months ago she was seized with sanguineous uterine discharge, accompanied by pain in the lower part of the back, the hips, and the groins, with an occasional sense of bearing down both in the rectum and vagina. I examined the uterus with my finger, and found it to be quite healthy. The rectum remained much the same as at the time of the operation, the bulk of the thickening being perhaps a little increased. Since that time she has suffered an attack of sub-acute peritonitis, and her legs have become œdematous. The abdomen also has increased in size; and her symptoms indicate the probability that the morbid growth in the pelvis which closed the rectum has extended into the abdomen, and is now producing injurious effects upon the contiguous structures.

In this case, after the failure of mechanical efforts to penetrate the stricture, and when the rectum had become impervious, the question arose as to what surgical operation was most applicable for the relief of the patient. Littre's method of forming an artificial anus in the groin seemed to

be open to these objections: *first*, that it involved a wound of the peritoneum, and a consequent danger of rekindling inflammation in that membrane, an attack of which had not long been subdued; *secondly*, that the existence of femoral hernia, although reducible, might impede the steps of the operation, as there would probably be found some small intestine in front of the colon, which might be fixed there by inflammatory adhesions, and might thus shut out the possibility of reaching the large bowel; *thirdly*, that as the site of obstruction was ascertained, there was no advantage in an exploratory incision of the peritoneum, which, as mentioned by Mr. Luke, is a desideratum in those cases of intestinal obstruction in which the nature and situation of the impediment cannot be ascertained. One argument alone was in favour of the inguinal operation, namely, that the bowel would thereby be opened at the lowest possible point above the stricture. On the other hand, the operation of opening the colon in the left loin seemed to present several advantages: *first*, it involved no wound of the serous membrane of the abdomen; *secondly*, the artificial aperture would be sufficiently low down to permit the perfect nutrition of the body, since very few lacteals open upon the villous surface of the lower portion of the large intestines, whilst it was certain that the accumulation of faeces in the sigmoid flexure of the colon below the lumbar opening and above the morbid growth in the rectum would be easily removed by injections from the wound if not expelled simultaneously with the accumulation above the aperture by the contractions of the colon; *thirdly*, I hoped that the greater distance of the artificial anus from the diseased part was not without the probable advantage that the sigmoid flexure of the colon might collapse after being emptied, and thus, by disuse of the bowel immediately above it, that the structural disease in the rectum might become quiescent, and have its progress delayed; and, *fourthly*, there does not appear to be so strong a tendency to prolapsus of the bowel through the artificial aperture when this is made in the loin, as when it is formed in the inguinal region.

Although the operation of opening the colon in the loin in fat persons must cause a deep wound, and although we might be led to anticipate inflammatory action in the loose cellular tissue of the loin or iliac fossa, either as the direct effect of the incisions, or from the possible occurrence of infiltration, yet the textures which are divided are not vitally important, and they are sufficiently organised to favour the process of repair. I have seen three of these cases, and in none of them has any serious inflammation of the divided textures proved a source of subsequent disquietude or trouble, whilst the dangers of extravasation were lessened in each by attaching the bowel to the skin before making the opening into its cavity. This course should always be adopted, unless a tube is left in the wound after the operation to serve as an escape pipe, and as a defence against extravasation, as suggested by Mr. Skey. The connection of the bowel with the integument secures a more free escape of the contained matter, and it averts all danger of exciting local irritation and inflammation by the retention of a foreign body, as an elastic or metallic tube, in the track of a recent wound.

The appearance of the anterior layer of the lumbar fascia when exposed in the course of the operation may induce the supposition that the intestine is reached before the lumbar space is opened. In two of the cases which I have seen the fascia projected at the bottom of the wound; it had a bluish green colour, and looked much like intestine. A little separation of the cellular membrane around the fascia by the finger or some blunt instrument will, however, fail to expose the longitudinal fibres which characterise the large intestine, and a careful puncture of the fascia with the knife will be followed by the protrusion of loose renal fat; indeed, until this loose renal fat is come to, the operator may feel assured that he has not arrived at the intestine. The bulging of this fascia is produced by the fulness of the organs over which it is stretched, and from the same cause a feeling of elasticity, like that of a distended bowel, is imparted to the finger applied to it.

The most important and difficult circumstance in the subsequent management of these cases, is the tendency to contraction in the cicatrix and the skin immediately surrounding the artificial aperture in the bowel; and, indeed, it appears that after these operations, in whatever manner or situation they are performed, the same disposition to a fistulous degeneration of the aperture takes place, as is known to exist when openings are made artificially or by the ulcerative process, so as to establish a communication between the interior of an intestine and the external surface of the body; for examples of which I may refer to cases of gangrenous herniæ, which are followed by the formation of an artificial anus; to those abscesses which sometimes form in connection with the cæcum; and to others occurring in various parts of the abdomen, by which foreign bodies have escaped from the intestine externally. In the present instance, I believe that the tendency to contraction was materially counteracted by the habitual use of the plug, which was a source of great comfort to the patient, inasmuch as it enabled her to go about, and to mix with the world without the accidental escape of the contents of the bowel.

Mr. Luke, who saw this patient with me when in Birmingham a short time ago, suggested the drilling of the ivory nipple forming the plug, so as to allow the escape of flatus without removing the instrument. The aperture in the plug must be small, and would, I fear, be often obstructed. It would also require a second plug in order to prevent the escape of air at inconvenient moments.

The inconvenience of the situation of a permanent aperture for the discharge of fæces from the body in the loin, has been stated as a reason for preferring the operation of Littre to that which has been advocated by Amussat. This objection must be admitted to a certain extent; but it is rather an assumption, the result of reasoning, than a reality met with in practice, and does not appear to be equal to the advantage of avoiding a wound of the serous membrane of the abdomen. After she became able to rise from her bed, my patient attended to her evacuations, as well as to the

dressing of the wound, herself; having withdrawn the plug she caught the discharges in a basin, cleaned the part afterwards, and at a later period, when the wound was cicatrised, introduced the instrument herself, by the aid of a looking-glass, without requiring the assistance of a second person.

In proposing the operation to the patient and her relatives, the inconveniences of the artificial anus were fully explained, and she distinctly understood that the operation would not cure her disease, but that it would remove the immediately perilous symptoms under which she was then suffering, and afford a fair chance of the prolongation of her life for some time. Under these circumstances the operation was performed; and its result has been most satisfactory, since it has already prolonged a life, which must have terminated in a few hours, to a period of *two years*, during which time my patient has been in comparative comfort, and, for the most part, competent to discharge all the duties of her station in life.

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POSTSCRIPT, *Aug.* 1852.—After the last report (page 237), the tumour in the abdomen and the dropsical symptoms rapidly increased; the powers of the patient were gradually exhausted, and she died on the *10th of February*, 1852. About three weeks before death, as the strength failed and emaciation advanced, the opening into the bowel in the left loin dilated to an extent which would admit two fingers, and through this opening a considerable prolapse or eversion of the colon took place. When the body was examined, three or four pints of turbid serum escaped from the cavity of the abdomen. The peritoneum exhibited the effects of peritonitis; the intestines were glued together, to the omentum, and to a tumour as large as a man's head, which appeared to emerge from the pelvis. This tumour arose from the right ovary, and consisted principally of cerebriiform cancer. A section of it displayed grey and white brain-like matter, with patches of ecchymosis here and there. In some parts of it there were cysts filled with the yellowish-

brown glue-like matter of colloid cancer, and other cysts from which serum had escaped. In the pelvis another tumour as large as an orange was found. This was the left ovary, in which the same morbid degeneration was going on as in the right. The liver and the mesentery also contained similar deposits. The uterus was healthy. The colon was healthy throughout; below the opening in the left lumbar colon made by the operation, the sigmoid flexure and the rectum were larger than the natural calibre, and contained some ounces of dark-coloured scybalæ. At a distance of about three inches from the anus the rectum was suddenly and completely closed by a dense firm fibrous structure not more than a quarter of an inch in extent; below this part the canal was again pervious down to the anus, but was contracted and empty. The coats of the rectum immediately above the stricture had a healthy appearance, though softer and more lacerable than usual. The artificial opening into the colon in the loin was carefully examined. Its shape was oblong, and its cutaneous margin had a firm cordy feeling. The structures surrounding this orifice, which had given so much trouble by its tendency to contraction, consisted of the skin and a dense fibro-cellular membrane. The muscles and fascia of the loins were all traced to within three eighths of an inch of the margin of the aperture, where they became blended together, and terminated in a mesh of strong interlacing fibro-cellular fibres, which were intimately connected both with the colon and the integument around the artificial opening.

A. B.

BIRMINGHAM;

*August 12, 1852.*

A CASE  
OF  
INTESTINAL OBSTRUCTION.

BY  
J. LUKE,

VICE-PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND,  
AND SENIOR SURGEON TO THE LONDON HOSPITAL.

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Received Feb. 10th.—Read Feb. 10th, 1852.

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I am desirous of laying the following case of Intestinal Obstruction before the Society without comment, as an addition to that which I presented to its consideration a short time since. It occurred in a blacksmith, 30 years of age, admitted, under the care of Dr. Pereira, into the London Hospital, December 16, 1851, complaining of rheumatic pain in the hips and knees, which he attributed to exposure to cold about five weeks previously. He had been the subject of rheumatic fever about seven years since; but both before and after that attack he had been in good health until the present illness. His bowels had not been opened for five days previous to admission, but the last evacuation had been very large. He vomited food and drink as soon as taken, and experienced pain in the abdomen on pressure, particularly when made upon its upper part. The whole abdomen was tumid and tympanitic. There was a reducible inguinal hernia on the left side. Ordered a common injection, which was followed by a small brownish evacuation.

17th. The pain and sickness are much the same as yesterday, and the bowels have not been opened. The pulse is 75 in the minute, soft and compressible. The skin is moist and warm, and the tongue is furred. Ordered

Ext. Colocynth. Comp., gr. x; Hydrarg. Chlorid. gr. ij, to be taken immediately.

The hernia was examined by Mr. Critchett, who found it reducible. Another injection was ordered, and one drop of croton oil to be taken.

18th. The symptoms have rather increased in severity. The countenance is anxious, and hiccough has supervened. The bowels are still confined, and everything taken into the stomach is vomited. The tongue and skin are much the same as yesterday, and the pulse 80. A tube passed per rectum met with obstruction at a distance of four or five inches from the anus, and was bent upon itself at that point, nor could it be further introduced. Four or five ounces of house medicine were injected, but almost immediately returned without producing any faecal evacuation. Ordered six leeches to the region of the umbilicus. Pil. Opii, gr. j, immediately, and a warm bath.

9, P.M. The pain of the abdomen is rather less. The sickness continues, and the bowels have not been opened. The tympanitic state of the abdomen is increased. Pulse 90. Ordered Pil. Opii, gr. j.

19th. The patient has passed a restless night. The abdomen is greatly distended and the pain much increased. There has not been any evacuation from the bowels, and a large quantity of faecaloid matter has been vomited. The countenance is more anxious and pale, the tongue furred and dry in the centre, and the pulse 80, soft and compressible. On examination it was thought that the distended transverse colon could be clearly made out in its passage across the abdomen. The tube of a stomach pump was again introduced per rectum by Mr. Critchett, and again met with obstruction, and could not be passed beyond four or five inches from the anus. Ordered Pil. Opii, gr. j, at night.

20th. The countenance is less anxious, and there has not been any increase of pain in the abdomen, and no sickness since last night. The tympanitis has increased a little. The secretion of urine has been plentiful.

At 1, P.M., a consultation of physicians and surgeons was held. After a general review of the symptoms, the surface of the abdomen was examined. The transverse colon was thought to be distended with flatus, as well as its descending portion, there being a more than ordinary protrusion of the abdominal parietes above the left groin. The stomach tube was several times introduced per rectum by different persons, and each time met with obstruction at four or five inches from the anus, and was coiled upon itself. A grumous fluid covered the finger when introduced by the side of the tube.

It was generally supposed that obstruction of the intestine existed at the upper part of the rectum or sigmoid flexure of the colon, but hope of relief without operation was not abandoned. It was suggested that warm water should be injected per anum while the pelvis was raised above the head. When this was done to the extent of five or six ounces, the water returned as fast as injected without faeces. Ordered to continue the opium pill.

21st. Another consultation of physicians and surgeons was held. The patient is apparently worse, and the pulse more weak. The abdomen is rather more tumid, but the swelling is more diffused, and neither the protrusion above the groin nor the apparent tract of the transverse colon is so distinctly marked as yesterday. The pain is seated chiefly above and about the umbilicus. The propriety of operative interference was again canvassed. All were agreed that intestinal obstruction existed, and that the indications pointed to the sigmoid flexure of the colon or to the top of the rectum as its probable seat; but to some it did not appear clear that all chance of relief from medicine alone had vanished. Taking, however, the general agreement that mechanical obstruction existed into consideration, and the probable increase of danger if relief was delayed, it was finally determined to explore that part of the abdomen in which the obstruction was suspected to be seated. An exploration was accordingly made, by means of a perpendicular incision above Poupart's ligament, on the outside of

the course of the epigastric artery, about two inches in extent. An opening being made into the abdomen, the peritoneum was divided to the extent of an inch. The descending colon and its sigmoid flexure, together with the rectum, as far as they could be reached with the finger introduced through the wound, were found empty and contracted. The small intestines, however, were greatly distended, and of a dark colour. That part of them which lay near was drawn through the wound, and a large quantity was thus exposed. After enlargement of the abdominal opening to the extent of three inches, an exploration with the finger was made as far as practicable, but without any satisfactory results, and the obstruction remained undiscovered. As the exploration proceeded, the patient became somewhat exhausted,—a condition which appeared to be augmented by the administration of chloroform; and on this account it was thought advisable to discontinue the search after the obstruction. The intestine and omentum which had been withdrawn from the abdomen were therefore returned, and the wound closed by four or five sutures.

Ordered brandy and water, and five grains of *Pil. Saponis c. Opio*; both to be repeated when necessary.

11:50 P.M. Patient appears quite easy, and says he feels no ill effects from the operation. Fæcaloid vomiting still continues; countenance placid; pulse 102. Ordered to continue the soap and opium pill.

22d. Has been quiet all night, and has slept a little. Vomiting has occurred once during the night; the bowels have not been relieved. The distension and pain on pressure of the abdomen are not greater than yesterday. He says he is easier than he has been since his admission into the hospital. Pulse 110. Tongue is covered in the centre by a whitish fur, but is moist; there is much thirst. Ordered *Hydrarg. Chlorid.*, gr. j; *Pil. Opii*, gr. ss, every three hours; and ice to be used to allay the thirst.

23d. The patient continues much in the same state as yesterday, but the pulse has increased to 120. Ordered to omit *Hydrarg. Chlorid.*, but to continue *Pil. Opii*, and to

take Pil. Saponis c. Opio, gr. v, at night. An injection of warm water was made per rectum ; it was, however, returned immediately without fæces.

24th. The countenance is more anxious ; the pulse 120, and feeble. The patient is evidently losing ground. The skin is clammy and the tongue furred. There is not much pain, but a troublesome hiccough has supervened. Ordered to continue Pil. Opii, to take wine and brandy, and to have a mustard poultice to the epigastrium ; after which, lint moistened with Tinet. Opii is to be applied.

25th. The features are pinched, the skin and nails blue. The patient is sinking. He gradually became insensible, and died at 10 : 30, P.M.

*Post-mortem Examination.*—The small intestines were very much distended, and occupied the whole front and lateral parts of the abdominal cavity, so as to exclude from view all the other abdominal viscera. Their convolutions were slightly adherent, and faint traces of lymph were here and there seen on the surface of the peritoneum. There were also red lines on the intestines, where their surfaces receded from each other. There were discovered two openings in the intestine, at the lower part of the cavity, supposed to have been made accidentally by the scalpel, and no fecal contents had escaped. When, with difficulty, these intestines were turned aside, the rectum and whole length of colon were found contracted and empty ; a lump of hardened fæces, however, occupied the cæcum. About four feet of the lowest part of the ilium were also found contracted and empty ; at that distance from the cæcum, the ilium became abruptly distended, and at the boundary between the contracted and distended parts was a small and narrow band of membrane, so disposed as to encircle the intestine, and similar in character to the adjoining peritoneum. It was thought to be congenital. The stomach was contracted, and the liver small ; the rectum was healthy. The wound of the operation was closed firmly by adhesions, both externally and internally, and a large cushion of omentum was adherent to its inner surface and parts adjoining.

After the removal of the intestines from the abdomen, a diverticulum was discovered, which had escaped previous observation. This was about three inches in length, and proceeded from the ileum about four inches below the obstructing band of membrane, and was so attached to the mesentery and collapsed, as to lead to its being in the first instance overlooked.

SOME OBSERVATIONS  
ON THE  
EFFECTS OF CHOLAGOGUE MEDICINES,  
AND SOME REMARKS ON  
MORBID CHANGES IN THE LIVER.

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Received March 23d.—Read June 8th, 1852.

A short summary of the author's views on the structure of the liver may properly precede the following account of the effects produced by certain cholagogue medicines, and some appended remarks on various morbid changes that are incident to the liver.

The mammalian liver consists mainly of a parenchymatous solid mass, marked out by the portal canals and fissures into lobules, which blend at their margins with each other. In the three lower vertebrate classes the lobular arrangement is scarcely to be observed, and is, therefore, evidently non-essential. The parenchyma consists of perfect cells, or nuclei, and diffused granular and oily matter. The ducts do not expand to enclose the parenchyma, nor are they prolonged as intercellular passages through it. They terminate either by closed rounded ends, or, as Kölliker believes, by abutting against the mass of parenchymal cells. The structure of the ultimate ducts is peculiar, consisting chiefly of nuclei, and seems fitted to exert an active elaborating function; they do not resemble mere efferent channels.

The ducts are supplied by the hepatic artery throughout their larger branches; but the ultimate ones are surrounded only by a scanty plexus, as they lie in the interlobular fissures, and are exposed besides to the secretion of the marginal cells. The portal vein is distributed exclusively to the parenchyma, the cells of which lie in the closest relation with its capillaries; the hepatic cells elaborate, out of the blastema supplied by these capillaries, the sugar which is formed in the liver during digestion, and which is again absorbed and carried off by the blood passing out by the hepatic vein. Yellow matter (pigmentary of the bile) is often seen in the cells, especially in the central cells of human livers; it is not nearly so often seen in the marginal, in which oil is much more apt to collect. The yellow matter may be extracted in large quantities by alcohol, and gives the reactions of biliary pigment, but not those of cholic acid and its conjugates. The author believes that these are formed out of oily, saccharine, and albuminous matters by the ultimate ducts, the nuclei of which remaining permanent, exercise constantly a "metabolic" action.

When the development of the liver is traced in the chick, the parenchyma is found to appear first; soon after, an eminence, consisting of dark oily matter, is seen on the wall of the future duodenum, from which two offsets proceed to the parenchyma of the liver: they do not, however, ramify in it, but retrograde and waste, the eminence, however, remaining. The cystic and hepatic ducts begin to be developed at a somewhat later period close to the liver, extend downwards, and open together into the intestine, just exactly at the eminence mentioned. For this eminence the author proposes the name of *colliculus*. The process in fishes and reptiles is essentially similar; in the former it proceeds very slowly; the liver is long a mere parenchymal mass, with a vesicular gall-bladder attached. The hepatocystic duct in tadpoles is lined at one time by a ciliated epithelium.

I now proceed to detail some experiments which I have made relative to the action of cholagogue medicines, in

which a careful examination was made of the intimate condition of the different organs wherever it appeared desirable.

To a healthy cat I gave Hydr. c. Cretâ, gr. v; she was killed by a blow on the head. The liver was found extremely gorged with blood, the gall-bladder containing a very dark yellow bile. The bile contained no visible object but columnar epithelium; its colour was unlike that of the yellow tinted cells often seen—more of a reddish yellow. I examined several thin sections: the capillaries were congested most excessively with blood, and formed an uniform plexus, with circular or elongated meshes. The diameter of the capillaries varied from  $\frac{1}{2500}$ th to  $\frac{1}{4000}$ th of an inch. The cells everywhere were pale, well-formed bodies, with soft mottled contents, imbedding numerous small oil drops. The envelope and the nucleus were pretty distinct. None exhibited the least yellow tint,—neither the marginal ones, nor those lying near the centres of the lobules. There was no trace of bile in the small intestine. I injected afterwards warm water into the hepatic vein, and washed out the blood; after this I made a watery extract of the part thus freed from its blood, and easily obtained evidence of abundance of sugar being present. This could only have existed in the cells. In this case the dose of the mercurial produced no evident effect, except that of causing considerable congestion.

I then tried the effect of larger and repeated doses. Three doses of calomel, gr. iij, were given to a full-grown cat, at intervals of about twelve hours:—she was killed fourteen hours after the last. The liver was extremely loaded with blood; the gall-bladder, as well as the ducts, contained much deep yellow bile; there was a faint tinge of bile in the middle of the small intestine, which increased towards the lower part, and became very marked there and in the large intestine. On examining thin sections, it was apparent that a prodigious quantity of yellow material had been formed in the cells of the margins of the lobules, and in those extending about half the distance to the centre. It appeared as yellow-coloured oil drops, which were quite distinctly *in* the cells; some few larger masses of reddish-brown or yellow aspect were free.

On dissecting out the ducts nothing different from their ordinary condition was observed. The nuclei were not tinged yellow. The lungs contained numerous whitish masses of varying size, consisting of well-formed granular cells, nuclei, &c.; they were not of the nature of tubercle, but rather of exudation. In this instance I am satisfied that the quantity of yellow matter seen in the exterior cells was the result of the calomel that had been given; some bile was also poured out into the intestine.

Another cat, for the sake of confirmation, was dosed in a similar manner. No bile was found in the small or large intestine; the gall-bladder and the ducts were full of dark-coloured secretion, as in the former cases. The cells of the parenchyma were found exceedingly loaded with oil; in some parts large masses of big oil drops were seen, or huge single oil drops. The cells about the centres of the lobules contained distinct yellow matter, either in the form of granules or molecules, or as a diffused fluid. There were seen here and there largish, reddish, or reddish-yellow, or brown masses, of a somewhat angular form, which were probably pigment matter. The smaller ducts were found perfectly natural; the larger ones and trunks often stained of a decided yellow colour. The lungs were healthy. I am inclined to think the enormous accumulation of oil in the liver was partly the effect of the mercurial as well as the accumulation of yellow matter in the cells, which, it is interesting to notice, was deposited not only in the cells but also *free* in their intervals.

To a kitten two or three weeks old I gave Hyd. c. Cretâ, about gr. viij, and killed her four hours after. There was a good deal of mucus in the intestinal canal, and the gall-bladder contained much dark yellow bile. The lobules of the liver on their margins, where they bound the fissures and spaces, were decidedly tinted with yellow matter, which contrasted remarkably with the pale, granular, and oily condition of the larger remaining parts. The cells were usually pale, granulous particles, well and definitely formed; they contained some oil drops, and were imbedded in oily matter,—but this was less abundant than usual: the yellow matter was seated

in the cells. On dissecting out the ducts, yellow tinted cells and bright deep-yellow particles were seen adhering to the Glissonian sheaths; none were seen in the ducts. The ultimate branches of these, as is usual in young creatures, were not completely formed,—not of a definite shape; their nuclei were more widely *espacés* than in the adult, and less isolated from the sheath itself.

I will also quote an earlier observation which I made upon a large, rough greyhound dog. He had Calomel, gr.v, given him, and was killed sixteen hours afterwards. The gall-bladder was full of healthy bile. The liver was much congested with blood: the cells were of a pale granular aspect, well defined, containing generally a few yellow molecules. Those situated on the margins were especially the seat of the yellow matter; it was seen in this situation constituting yellow sheaths or patches. The arrangement of the cells was plexiform rather than linear; there was but little oily matter in them. The structure of the ultimate ducts was quite natural; but among the nuclei numerous yellow molecules were seen clustering, as it were, over them: these were very similar to those in the hepatic cells. This observation, as well as the preceding, leave no doubt on my mind that the action of mercurials on the liver is to produce a greater quantity of yellow matter in the cells. While I regarded yellow matter as identical with bile, relying solely on the indication of colour, I felt no doubt that this was biliary matter, and supposed that these experiments afforded even more positive proof than we had before, that the action of mercurials increases the production of bile; that is to say that it not merely increases the *flow* of bile, by emulging the ducts and gall-bladder of their contents, but actually causes a greater quantity to be formed. And, indeed, it may still be so; the quantity of glycocholate of soda, the organic salt of the bile, may really be increased; but of this the above experiments do not give any proof. It will, however, be interesting to compare the above results with those obtained when other cholagogue medicines were given, some of which influenced the *flow* of bile much more decidedly than mercury.

*Colchicum*.—To a healthy young dog a rather large dose of the wine was given. It produced vomiting and several clay-coloured evacuations. The liver presented hepatic venous congestion of first degree very well marked; the gall-bladder was greatly distended with greenish-yellow bile. The stomach was empty; its mucous membrane was of a pale white, with a blush of red here and there; its secretion faintly acid. The duodenum was empty; its surface covered with a quantity of watery and mucous fluid deeply bile-tinged; its capillary plexus was injected here and there. The small intestine was covered on its inner surface in the upper half of its extent by a layer of deeply yellow-tinged mucous fluid; the lower half, or rather more, was paler, not covered by fluid, and without any yellow tinge; the limit to which the bile-flow had reached was very marked. The last two inches of the small intestine, as well as the cæcum and large intestine, were covered by a red grumous fluid, which consisted of a tenacious, transparent, partly granular plasma, containing multitudes of mucous or puriform globules and blood discs. The mucous membrane covered by this red fluid was in parts injected and softened. In a section it was seen that there was thickening and granulous deposit around the Lieberkühn tubes, and some enlargement perhaps of the solitary glands. In the liver the capillaries surrounding the intra-lobular vein and the interlobular veins also were congested with blood. The cells were pale granular bodies, without any yellow tinge; they lay in a granulous basis matter, which also contained free nuclei and small groups of free oil drops. In some few cells here and there were seen bright yellow particles extremely distinct; but none such existed in the vast majority. The ducts were in that opaque condition so common in London dogs, and which renders their course so easy to trace. This depends on the deposit of numerous oily molecules between the nuclei; it is not the minute ducts only that are affected, but the whole extent of the excretory apparatus. The columnar particles of the gall-bladder and larger ducts are filled in their interior with minute oil drops, and the surface in the

fresh state is of a dead white aspect. The effect of colchicum thus appears to be rather that of emulging the excretory passages of bile, than of promoting the formation of yellow matter (perhaps biliary) in the cells.

A cat was dosed twice with half a grain of tartarised antimony: she died of the effects. The liver was rather congested; the gall-bladder was full of bright yellow bile, which was very tenacious, and contained much visible oily matter. Bile had flowed out plentifully into the intestine. The cells of the hepatic parenchyma were very perfect, and contained, especially on the margins of the lobules, much oily matter; they were in no part tinged yellow. The ducts were quite natural. Thus, there was evidence of bile having been emulged by this drug from the excretory passages, but none to show that an increased quantity had been *formed*. The effect produced on the mucous surfaces of the intestine and pulmonary cavities, and on the blood in various parts, was very remarkable, and is detailed elsewhere. (*Vide* 'Med. Times and Gazette,' March 19, 1852.)

To a young dog Aloës, gr. iij, was given twice, once fourteen hours, and again two hours before he was killed. A curious circumstance happened before life was extinct. Strong inspiratory movements were going on, and when one of the large veins was wounded, air rushed in large quantity; immediately after this a loud systolic blowing murmur, audible at some distance from the body, commenced, and continued for some time:—it evidently was occasioned by the frothy condition of the blood expelled by the contraction of the ventricle. The liver was quite natural, moderately full of blood; the gall-bladder was moderately distended with yellowish bile. The whole length of the intestinal tract was tinged yellow by the bile which had flowed out; the mucous membrane was nowhere injected, or showed a trace of irritation; the epithelium remained attached. There was accumulation of oily matter in the central cells of the lobules of the liver; it constituted distinct whitish spots about the size of a pin's head. The cells were generally pale, granular bodies, and did not contain more than a

very little oil, nor had they any decided yellow tint. The ducts were very distinct, being rendered opaque by oily deposit between their nuclei. Aloës in this case certainly acted as an efficient cholagogue, but no yellow matter was produced in the hepatic cells.

Oil of turpentine caused some bile flow, and distension of the gall-bladder with bile, in a dog; no yellow matter was observed in the cells. The lungs were a good deal congested, and in some parts hepatised. The intestinal mucous surface showed traces of irritation; it was injected in parts, especially the large intestine, and covered with more or less of tenacious mucus.

Two doses of rhubarb were given to a kitten, at an interval of about twelve hours; two evacuations followed, the last a copious, solid, dark-green one. The liver was pale, the gall-bladder contained some bile, of a very dark, reddish-yellow tint; the cells were pale, well-formed, containing little oil and no yellow matter; the ducts were slightly opaque, from oily deposit. The whole of the mucous surface of the small intestine was decidedly but not deeply yellow tinged,—that of the large intestine was not, it was pale and white.

Another kitten, of the same age, was treated with the nitro-muriatic acid bath six times, for five minutes at a time, in the course of four days. The blood of the hepatic vein contained well-formed globules, which sometimes formed *rouleaux*, and a moderate number of white corpuscles. The blood of the portal vein presented no visible difference, except that it contained numerous small corpuscles, the germs, probably, of new blood-globules. The liver was extremely pale,—the edges translucent; the bile in the gall-bladder of a very light yellow colour, altogether unlike that of the preceding instance. The cells were perfectly pale, devoid of any yellow tint, and contained very little oil; there was scarce any free oil; the ducts were quite natural. The capillary plexus was most beautifully seen, and the cells lying in its interstices; the meshes were oval or circular, and exactly moulded on the cell, so as to leave no apparent inter-

cellular passages. The small intestine was pale, or but very feebly bile-tinged in its upper three-fourths, in its lower part it contained a good deal of deeply bile-tinged matter; the large intestine was full of ordinary dark-green fæces. The stomach was quite healthy, it contained much half-digested food, and gave a distinct acid reaction. The bile-tinged matter in the lower part of the small intestine was chiefly mucus, in this some long muscular fibres were entangled, which were very particularly bile-tinged, very much more than the surrounding mucus.

An adult cat, similarly treated, presented more marked traces of bile-flow, but the bile in the gall-bladder was of the ordinary dark-green colour; the hepatic cells contained numerous concrete, oily molecules, and were devoid of any yellow tint. Thus nitro-muriatic acid does not increase the production of yellow matter in the hepatic cells, but rather seems to tend to diminish it; it also seems to have a cholagogue effect.

A full-grown cat took, during three days, eight grains of taraxacum (the extract) daily, and then for two days longer, twelve grains daily. On examination, the liver was found perfectly natural, the gall-bladder contained bile of the usual dark-green colour. The stomach was empty and pale, except near the pylorus, where it contained some deeply bile-tinged mucous fluid; this extended to the adjacent part of the duodenum, but below this the colour diminished, and the whole surface of the small intestine, except the lower fifth, was barely tinged of a light yellow colour. The lowest part of the ileum was of a dull white, manifestly different from the above, but contained here and there some faecal matter, with deeply yellow-coloured mucus; the surface of the large intestine was decidedly tinged yellow, and the canal was full of natural fæces. There was considerable accumulation of oily matter in the central parts of the lobules of the liver; the cells in the external parts contained a moderate quantity of oil, and were surrounded also by much free oily matter. No yellow matter was visible in them. The ducts, on being dissected out, were found quite natural.

A cat, pregnant with four foetuses, which were at about the end of the first third of intra-uterine existence, was dosed with muriate of manganese. Half a drachm dissolved in water was given at mid-day, and again in the evening; she was found dead in the morning. She had not been purged. The lungs and heart were healthy, the former crepitant but rather congested. The stomach was empty, its mucous membrane of a rather dark red; there was no trace of yellow matter throughout the whole length of the intestine, small and large; the only contents were mucus, and some remains of food. The liver was rather full of blood, the gall-bladder very pale, containing very little bile, which was of an orange colour, and mingled with a good deal of mucus; under the microscope it showed nothing but columnar epithelium, a little oily and granular matter. The cells of the liver were very well formed, generally more opaque than usual, many of them contained yellow matter, so that when *in situ*, streaks of yellow matter were seen radiating outwards towards the periphery: the yellow matter did not appear to be in one part more than in another. There were also some masses of free yellow matter. The ducts appeared natural. There was no yellow matter to be seen in the spleen.

The general result of the foregoing details is that of the various cholagogue substances tried. Mercury, muriate of manganese, and colchicum, are the only ones which seem to increase the production of yellow matter in the cells of the liver. I have placed them in the order of their potency. That they also increase the production of glycocholate and taurocholate of soda I think very probable; but unless we were assured that the quantity of these principles is always proportionate to that of the yellow pigment, which does not seem to be the case, the above experiments say nothing as to this point. It is clear that the cholagogue action of a medicine, its emulging effect on the ducts, is distinct from that which it exerts in the *production* of biliary pigment. Jaundice has been known to come on during a mercurial course, and apparently an effect of the medicine. I have at present a patient under my observation (one of Dr. Chambers

in St. Mary's Hospital), who reports her jaundice to have appeared after taking a six grain calomel pill. These statements are in accordance with the experiments I have detailed,—the animals to whom I gave mercury had jaundice of the liver.

One very important effect to be noticed of the administration of mercury on the liver is, that it certainly produces very great congestion of the organ; this is an argument for rather forbearing the use of this remedy in inflammation of the substance of the liver, a practice which would otherwise be recommended by our analogical experience.

The fatty condition of the liver which is so often observed, has been so well described and examined, that it must appear superfluous to offer any remarks upon it. I think, however, there are some points of detail which are worth a short notice. It seems a fair question, What constitutes truly fatty degeneration of the liver? Is it to be regarded as a simple increase of the quantity of oil naturally existing in the hepatic cells, or is it a further and more important change? I am much inclined to think that the latter is the case, and that a real distinction exists between the condition of oily accumulation when there is simply an undue quantity of oil present in the parenchyma, and that of true fatty degeneration when the natural structure is more or less altered and destroyed. To illustrate this I will quote first the instance of a kitten, which had been fed for about a week on food containing much oily matter. The liver was of a dull grayish-yellow tint, in the first stage of hepatic venous congestion. Sections viewed under the microscope were utterly opaque, and showed both the cells and the intercellular substance loaded with oily molecules; the accumulation of oil was equal everywhere. The ultimate ducts were dissected out and found natural. Here all that had occurred was the addition of a quantity of oil to the hepatic parenchyma (not to the ducts), there was *no degeneration* of the cells. In contrast to this instance I will place the notes I made of the condition of two livers taken from the bodies of two persons who died in St. George's Hospital. In one

“the liver was in a complete state of fatty degeneration ; the oil drops, however, did not seem to be enclosed in distinct cells, but to lie in an indistinct granular or semi-fibrous stratum ; scarce any distinct cells were to be seen.” In the second, the liver being also in a state of complete fatty degeneration, I observed that the cells were, for the most part, destroyed, and that only films of granular matter remained ; the number of free nuclei also seemed to be fewer than usual. In these two cases it was quite evident that the natural cell structure of the liver was, to a great extent, destroyed, that a real degeneration had taken place ; and this I have repeatedly observed in most cases of fatty degeneration of the liver, occurring in persons who have died of various diseases. Whether a liver, whose cells are thus destroyed, can recover its natural condition, is a question of much interest, but one which it seems impossible to answer.

A circumstance of much interest, which seems still further to indicate the degenerative character of the fatty transformation of the human liver, is that in such livers, I have almost invariably been unable to detect the existence of sugar, and this is confirmed also by the experience of my friend Mr. Blyth. This, however, was not the case with the kitten's liver, who had been fed on fatty food,—it yielded on analysis a full proportion of saccharine matter.

Another point which has not been much noticed is the peculiar limitation of fatty degeneration to the margins of the lobules, which is very frequent. I think the change does not consist merely in accumulation of oil in the marginal cells, but that destruction of them actually takes place. A liver affected in this way, presents the lobules most perfectly marked out by a zone of opaque matter, this varies in different cases somewhat in width, but may be said generally to occupy about one fifth or one fourth of the distance from the margin to the centre. I can give no sufficient explanation of the tendency of oil to accumulate in the marginal cells ; it may, perhaps, in part depend on the circumstance that the stream of portal blood first passes through them ; but this does not at all account for the converse

occurrence, viz., oily accumulation in the central cells, which issometimes very marked in the healthy livers of animals. There is commonly but little yellow matter in the cells of livers deeply affected with fatty degeneration,—sometimes, however, it is sufficiently apparent in a few here and there; the common condition of livers which present more or less of the “nutmeg” aspect, is oily accumulation or fatty degeneration of the margins, with heaping up of yellow molecules in the central cells around the intra-lobular vein.

Fatty degeneration of the liver, when complete, may occur in very different diseases; it is by no means peculiar to phthisis, as is well ascertained. Out of 19 cases which I examined microscopically, four or five only had any connection with phthisis; the others occurred in diseases of various kinds, which, for the most part, but not invariably, had produced great emaciation.

Another kind of degenerative change is present in the much more rare *lardaceous* liver. One specimen of this kind which I examined, had the following characters: it was enlarged, bulky, of solid feel and glossy aspect, having a yellowish tint with some whitish spots, and containing very little blood. Thin sections under the microscope showed some of the lobules in a pretty natural state, the cells perhaps rather enlarged, and arranged very much in a linear manner. In other lobules there was a manifest infiltration between the cells, of an homogeneous, highly refracting substance, much resembling concrete oily matter; this was very abundant in some parts, so much so as to compress the cells and reduce them to mere bands anastomosing together, and producing the appearance of a plexus containing the homogeneous matter in its meshes. In many spots, especially in the vicinity of the deposited substance, the cells were deeply tinged with yellow matter. The refracting matter in another instance consisted of spherical, oval, or irregular shaped masses, which had somewhat the size and figure of the natural cells, but did not, I think, result from a transformation of these. Liquor Potassæ added to thin sections under the microscope reduced the deposited matter to mere filmy

fragments, and diminished considerably the refracting power ; its action upon this substance and the surrounding cells, many of which contained much oil, was very different ; the latter becoming more transparent exhibited their oily contents with great distinctness ; the former, though quite translucent, showed no trace of oily matter. The minute ducts in the latter specimen, as well as in the former, were of natural appearance. I have several times examined spleens from the human subject, which contained a great quantity of matter precisely similar in appearance to that which was here deposited ; its seat in the spleen appears to be chiefly the Malpighian bodies whose natural cell structure it replaces, and then extending outwards, brings about an atrophy of the red pulp, which occurs to such an extent that at last mere red streaks are seen separating the translucent glistening substance, and the natural deep colour of the organ is lost. The term by which Rokitansky designates this peculiar deposit, is the "lardaceous" (speckig), and the pathological relations he assigns to it is with "constitutional disease of the vegetative system, especially with scrofulous and rickety disease, with syphilitic and mercurial cachexia," and occasionally as a sequel of intermittent fever. Dr. Budd recognises this condition as a scrofulous enlargement of the liver ; this I think is so far correct, as intimating its relation to scrofulous disease, but it ought clearly to be understood that the deposit is totally different from tubercle, and is, indeed, so far as I know, *sui generis*.

The minute ducts in the fatty and last-described condition of liver have appeared to me pretty natural ; this fact renders it more easy to understand how, with so considerable alteration of the parenchyma, bile can still be secreted.

Rokitansky, describing cirrhosis, says—"We are not of opinion that granular liver always takes its origin in the same fundamental affection ; we are inclined to adopt two morbid states as the essential and original anomalies which give rise to granulations in the hepatic parenchyma as a secondary affection. In one case there is a morbid development of the capillary gall ducts, (the so-called secreting

tissue,) an accumulation of the secretion, and probably also an hypertrophy of the parietes of those vessels giving rise to the nutmeg liver and to an obliteration of the capillary blood-vessels, the so-called vascular substance." . . . . .

"In the second case, the original affection of the hepatic parenchyma in granular liver is proved, by the post-mortem appearance of the granulations, to consist in a slow chronic inflammation. This induces a gradual obliteration of the parts attacked, and their conversion into fibro-cellular tissue, the amount of which varies in proportion as the processes of absorption or organisation predominate in the inflammatory product. This secondary metamorphosis, from not occurring uniformly, results in a subdivision of the organ into larger and smaller scattered compartments, which present the characteristic rounded form of the granulations in the same ratio as they correspond to single hepatic lobules."

Dr. Budd, in his chapter on Cirrhosis, describes it as "the consequence of adhesive inflammation in the areolar tissue about the small twigs of the portal vein, by which serum and coagulable lymph are poured out. The serous part of the effusion gets absorbed, and the fibrine contracts and becomes converted into dense fibrous tissue, which divides the lobular substance of the liver into well-defined masses," &c.

I cannot say that I have observed any condition corresponding to the first form of cirrhosis which Rokitsansky describes. A morbid development of the capillary gall ducts must mean a morbid enlargement of the hepatic cells of the lobules, and such I have never seen in this disease. Dr. Budd's description expresses the opinion ordinarily received, to which I have but little to add that can be esteemed new. I think, however, that a somewhat different view may be taken of the nature of the morbid change constituting cirrhosis, and that some of its different forms may be more exactly traced.

In some cases, no doubt, the fibrous tissue of the Glissonian sheath is affected with what may be truly called adhesive inflammation, attended with the effusion of coagulable lymph and serum. These cases will be marked by

tolerably distinct symptoms—pain in the side, vomiting, fever, perhaps jaundice, as Dr. Budd enumerates them. The portal canals are the seat of the inflammation,—chiefly, I believe, the larger, and not to any great degree the smaller, canals or the fissures. In other instances, which I believe are more numerous, the same parts may be affected, but the nature of the change is different. The fibrous tissue of the sheaths undergoes thickening and condensation, but not as a consequence of effusion of lymph and serum in an acute attack; the process is much more of the nature of degeneration, more akin to the chronic thickenings which are so often observed in fibro-serous membranes, and which are often coincident with this condition of the liver. The result of the above changes, when they do not extend to the smallest portal canals and interlobular fissures, is, I believe, the common hob-nail condition of the liver. If the thickening and condensation proceed further, and affect the sheaths which surround and invest the lobules, then the condition is different, and corresponds very nearly with that which I described in a communication to the Pathological Society, three years ago, under the name of “nutmeg liver.” This description I subjoin, but would remark, at the same time, that in several of these cases I have no doubt that there takes place also a deposition of unhealthy plasmatic fluid in the substance of the lobules, which solidifies them, and tends to increase still further the atrophy of the cells which the defective supply of blood induces. It is difficult, in examining the *débris* of the parts thus degenerated, to distinguish accurately, in all particulars, between what should be regarded as cause, and what as effect; but, though aware of this, I still am strongly inclined to believe that such a process as I have indicated does actually affect the lobules themselves, and that the unhealthy nutritive process, which is the essence of cirrhosis, may manifest itself chiefly in either of three situations:—1. In the larger and middling-sized portal canals, excluding only the smallest. 2. In these last, and in the fissures. 3. In the smaller canals and fissures, and in the substance of the lobules. The first form

results, as said, in the common hobnail liver; the second and third produce tough, firm, dense livers, which are sometimes termed "brawny."

The following is the quotation from the Report of the Pathological Society:—"The form of the liver, in the condition referred to, is scarcely at all altered; its edges are not rounded, nor its surface puckered,—or, if these changes have occurred, they are but slight; its capsule is often smooth, and free from false membrane or other traces of chronic inflammation; its consistence, however, is greatly increased, it is much less fragile, and tears much less easily than natural. On the surface of a section, deep red patches of sanguine congestion are observed coalescing irregularly with each other, and leaving in their interspaces pale greyish or slightly yellow spots; the relative size of the congested and non-congested patches may vary somewhat, but the boundary between them is extremely well defined, the deep tint of red ceasing abruptly, and not shading off into the pale hue of the circumscribed grey spots. Under the microscope it is seen that the cells in the central parts of the lobules, which are the chief seat of congestion, are remarkably altered; they are gorged with yellow matter, and appear as round or oval masses of dark yellow or reddish substance; they are much less numerous than in the healthy state, and lie no longer closely in contact with each other. This condition of the secreting structure is coextensive with the congestion of blood; beyond this, towards the exterior of the lobules, a very different condition is found to exist; here the cells are no longer distinct from biliary engorgement; on the contrary, they are pale, stunted, starved, and often scarcely discernible, or appearing as mere *débris* in the midst of an amorpho-granular basis substance. In some cases the fissures are greatly enlarged: instead of having a diameter of  $\frac{1}{333}$  inch, or rather less, I have found several to measure as much as  $\frac{1}{34}$  or even  $\frac{1}{44}$  inch; this increase in width taking place, of course, at the expense of the lobules, which thus become considerably diminished. The investing membrane of the lobules is very greatly increased, and becomes much

more condensed and more distinctly fibrous ; it has appeared to me in some instances to be continuous with the amorpho-granular substance which infiltrates the pale external portion of the lobules. It also seems to me very probable that these cases, where the fissures become so greatly enlarged at the expense of the parenchyma, are but further stages of the degenerating process above described ; for, as the exterior part of the lobules becomes atrophied from the deposition of an amorpho-granular basis substance, and loses its natural structure, it will tend to become blended with the fibrous tissue of the continually enlarging fissure. The foramina, which are commonly so evident in thin sections existing at the interlobular spaces, are no longer apparent, the pressure of the thickened fibrous tissue having obliterated the corresponding branches of the portal vein.

“The essential circumstance in the changes now described seem to be the effusion of an unhealthy plasma, not only in the canals and fissures, where it induces unnatural increase and condensation of the fibrous sheaths, but also in the external part of the lobules, where it passes into a solid form, and constitutes an amorpho-granular basis substance, compressing the capillaries and stunting the secreting cells. At the same time the thickened fibrous tissue of the canals and fissures still further obstructs the arrival of blood in the lobules, which thus at last are scarcely supplied otherwise than by the reflux of blood into the ultimate twigs of the hepatic vein and the capillaries which immediately surround them ; and thus the morbid congestion of the interior of the lobules is accounted for, and the peculiar yellow engorgement of the cells in this situation, as depending on their congestion.

“In two instances that I observed, where the liver had undergone this change, there was contraction of the mitral orifice of the heart, by chronic thickening of the tissue of the valve and of the cordæ tendineæ. This confirms the view I am inclined to take of the pathological nature of this alteration, viz., that it is a fibrous degeneration of the secreting structure from an unhealthy state of the plasma

supplied to it by the blood, and not an inflammatory action producing effusion of lymph. So far as I have observed, this degenerating process does not terminate in the irregularly contracted 'hobnail' condition, which is the result of cirrhosis; nor have I ever seen in such livers so serious and considerable a lesion of the secreting cells."

The view which I have proposed, that the thickening and condensation of the fibrous tissue in the liver is not so much the effect of any inflammatory action as of a slow degenerative process, such as stiffens the valves of the heart and contracts the orifices, is on the whole supported by the results which are exhibited in the appended Table. It contains a list of 30 cases, in which there appeared, on microscopic examination, more or less thickening of the fibrous sheaths derived from the capsule of Glisson. In 13 of these there was certainly coincident fibrous degeneration taking place in other organs; in 14 cases it may be considered doubtful whether there was any such coincident change; and in 3 there was none. I have included among the 14 doubtful cases several of large, firm, infarcted kidneys, with more or less unnaturally adherent capsules. This morbid alteration I believe myself to belong to that state of system which produces cirrhosis and thickening of the fibrous tissue in other parts; but it may not be so considered by others. The 3d, 47th, and 69th cases are particularly interesting, as showing the existence, at a former period, of tubercular disease, which became quiescent, and was superseded by a diathesis and disease of a very different kind, which might, perhaps, be appropriately named the fibrinous. If, indeed, the view should prove correct which is entertained by some eminent pathologists, that fibrine is an excrementitious or effete substance—not, as was formerly supposed, one of the highest importance to the renewal and growth of tissues—then the existence of such a diathesis and morbid state as I have just alluded to would become in a still higher degree probable. We should then recognise the fibrinous as a form of excrementitious plethora, in which a fluid material, characterised by a tendency to spon-

taneous coagulation, and existing in the blood probably in undue quantity, produced injurious effects, by slowly perverting the nutrition and spoiling the texture of various parts: we should perceive a connection between various phenomena which now appear isolated. The deposition of vegetations, so called, on the valves of the heart, or the deposit of fibrinous masses in the spleen or elsewhere, would then appear as instances of tumultuous and excessive formation of fibrine in the blood, which was thus cast out hurriedly in these parts. The presence of fibrinous nodules beneath the capsule of the liver, or on the pulmonary pleura, would indicate a process of a similar but much more gradual nature. All the various thickenings of fibrous or fibro-serous membranes, stiffening of the valves of the heart, contraction of its orifices, shortening of its cordæ tendineæ, many of the common pleural adhesions, white pericardial patches, would be properly ranked as having their origin in a similar morbid condition of the blood. They would appear then as manifestations of a general state, and not as local affections.<sup>1</sup> The common fibrous tumour of the uterus would be a particular localisation of the general diathesis. There would appear reason to consider the large, firm, dense kidney, with its adherent capsule, as another result of such morbid action. The adhesion of the capsule to the surface is evidently the result of a similar change to that which thickens the capsule of the liver, and the increased bulk and coarser condition of the epithelium of the tubes may not improbably be attributed to its having undergone a kindred change, modified, of course, by its own peculiar nature. I cannot help remarking that no term seems to me, in many cases, so exactly to describe the condition of the renal epithelium in this condition of the organ as the word *stiff*; comparing the morbid structure with the healthy, it gives one the idea of being as much incapacitated from undergoing its normal chemico-vital changes as a stiff and rigid aortic valve is from following its

<sup>1</sup> Rokitsky says, "The bases for fibroid new formations are solid, most probably always fibrinous blastemata."

natural easy movement. Again, under the head of fibrinous disease, we should range various forms of so-called chronic pneumonia, in which, with little appearance of acute inflammation, there has taken place exudation into the cavities of the air-cells, and complete condensation of the tissue. Some of these cases, by the nature of the exuded material, would form a connecting link between chronic pneumonia (the fibrinous) and the recognised tubercular infiltration. The above are all instances of extra-vascular change produced by the fibrinous disease; one, however, we may refer to as originating in the interior of the vessels, and occasioning, by its arrest of the circulation, irremediable gangrene of the parts thus deprived of their supply of blood. I allude to the spontaneous coagulation of the blood within the vessels, of which several instances have lately been recorded, and which can be ascribed with no kind of probability to any other cause than such a state of the blood as we are now considering.<sup>1</sup>

The preceding is rather a long discussion, but may be excused, I trust, from its intimate connection with the pathology of cirrhosis.

The form of cirrhosis which produces the "brawny" liver often coexists with dilatation and hypertrophy of the heart, the former predominating more or less. The retardation of the circulation thus occasioned throws the blood back upon the large veins; and the hepatic veins in particular, with their radicles in the centre of the lobules, are in consequence much congested. I am strongly inclined to think that this congestion of the central part of the lobules has much to do with the peculiar alteration of the cells which there takes place, and which is almost exactly co-terminous with the congestion. The bile-pigment is in all probability derived from the colouring matter of the blood, and it is worth noticing that this yellow matter is especially collected in those parts which are especially the seat of sanguine con-

<sup>1</sup> When the above was written I was quite unacquainted with Rokitsansky's doctrine of fibrinous crases of the blood, contained in vol. I of his work. The coincidence of opinion of independent observers is not without value.

gestion. Hepatic venous congestion of the first degree is far the most common; and it is in the same part which this occupies, viz., in the centre of the lobules, that we find almost invariably yellow matter present in the cells.

Cirrhosis is sometimes combined with fatty transformation; a section then presents opaque inlets, the lobules gorged with fatty matter separated by wide, more transparent spaces, which are the enlarged fissures and spaces occupied by new-formed fibroid tissue.

The ultimate ducts in cirrhosis are of course involved in the dense fibroid tissue, and are more or less atrophied by its pressure; their nuclei appear stunted and starved, and the structure is sometimes altogether lost, at least the ducts can no longer be discovered. Usually, however, by the aid of acetic acid they can be seen pretty readily in the widened fissures and canals.

Jaundice manifestly results from the conveyance into the blood of biliary pigment, that constituent of the bile which is certainly excrementitious and intended to be cast out with the faecal matter. In most cases there is retention of the yellow matter in the liver, from a mechanical obstacle to its flow into the intestine, or from inaction of the excretory ducts; the retained matter, which, however, is not in excess, being absorbed into the blood instead of passing out with the secretion. In other cases it seems to be formed in excessive and unnatural quantity, as in the acute yellow atrophy of the liver, and perhaps in diseases of the heart, producing great congestion of the veins. It is extremely common to find yellow matter in the cells of the central parts of the lobules in cases of different description quite unattended with any jaundice: this is so frequently the case that it really seems probable that it results from the congestion of the intra-lobular veins and surrounding capillaries which takes place during the last hours of life. Great dilatation of the cavities of the heart, with consequent retardation of the circulation, produces most remarkable yellow engorgement of the central cells of the lobules, and this condition is, I think, not unfrequently accompanied

with marked jaundice. In this case, however, I believe there is no cessation of the flow of bile into the intestine; the function of the ultimate ducts and of the exterior cells is still performed; and there seems only to be increased production of yellow pigment in the central cells. It must be borne in mind that this yellow pigment as it exists in the cells does not evidence the presence of biliary matter, of cholic acid, or its conjugates. The yellow matter can be extracted by alcohol, and gives the characteristic reaction of bile-pigment with nitric acid; but Pettenkoffer's test decides against the presence of the organic biliary acid. The deep colour of the urine in jaundice also seems to depend solely on the presence of the pigment; no trace of cholic acid is often discoverable. I conclude, therefore, that in most cases jaundice results from the absorption into the blood not of completely formed bile, but of one of its constituents only, viz., the yellow pigment. This takes place, (1,) when a mechanical obstacle prevents the flow of bile into the intestine through the duct. com. choled.; the bile then accumulates in the larger ducts and distends them: it continues to be secreted for some time, but afterwards, accumulation of yellow matter takes place in the cells, from which it is no longer freely extracted by the elaborating ducts; (2,) when inaction of the elaborating ducts occurs. This is the commonest case; the cells become filled with yellow matter, as before, because it is not withdrawn from them; (3,) when, with or without impairment of the action of the excretory ducts, an increased quantity of yellow pigment is formed in the parenchyma of the liver.

I may quote here some remarks from Prof. Lehmann's work on *Physiological Chemistry*, which seem to me not only to bear out the opinion he adopts, that the components of the bile are not formed in the blood, but also to support the view I have maintained, that the bile is not completely formed in and by the hepatic cells, but that this is effected by the action of the ultimate ducts. Lehmann says, "It is just in disease of the parenchyma of the liver that jaundice very seldom occurs; in fatty liver, bacony liver, and the rare tuberculosis of the liver, certainly never; even in

granular liver and inflammation of its substance but seldom. Jaundice only presents itself constantly in diseases of the gall passages, and in acute yellow atrophy."

Now, if with these various alterations of the parenchyma of the liver bile can still be formed, as we know it often is, it seems highly probable that some other apparatus besides the cells has a large share in the formation of this secretion, or at least is capable of taking such.

I will conclude these very imperfect remarks on the subject of jaundice by the detail of two instances of acute degeneration of the liver, which I have recently had the opportunity of examining through the kindness of my friend Dr. Ogle. The first is an instance of acute yellow atrophy, as it is termed by Rokitsansky.

A. B—, a lad, admitted into St. George's Hospital, Sept. 24th. He stated his illness to have lasted only one week, having had sickness and pain at epigastrium, and being jaundiced. His urine, however, had been darker than natural for a fortnight. He had taken balsam copaibæ for gonorrhœa the last two months. On admission his pulse was 64, rather weak; bowels said to be relaxed, and motions of a light colour; had severe headache and pain of stomach. Fomentations: Hyd. c. Cretâ and Ol. Ricini. Motion next morning very offensive, of pale yellow colour; some tenderness in the right hypochondrium. Jaundice, in spite of Calomel, gr. j, ter. die, became considerably deeper, and he suffered from sickness. Bowels rather costive; motions very pale, but vomited matter coloured by bile. He began in about nine days to be mercurialised; pills omitted; but jaundice deepened. Nitro-muriatic acid was given. There was now no pain, but sickness very distressing; no food whatever retained. Latterly he became very drowsy; pupils dilated. On October 10th there was stupor, occasional delirium, and succeeding coma. He died on October 12th.

*Post-mortem examination, 57 hours after death.*—General jaundice; lungs and heart healthy; yellow serum in pericardium; endocardium tinged yellow; some yellow serum in peritoneum. Intestines healthy; dark olive-coloured fluid in duodenum and stomach. Liver weighed 2 lbs.; the

cut surface was of a bright gamboge colour, the ducts quite pervious. Gall-bladder contained much thin fluid, barely tinged by bile-pigment. Lymphatic glands of mesentery and about the lesser curvature of the stomach much enlarged; kidneys much congested, but healthy, weight 13 oz.; spleen healthy, weighed 6 oz.

*Microscopic examination.*—Liver flabby, apparently bloodless, of deep yellow colour. The parenchyma consists of a mass of broken-up granular matter, tinged deeply yellow and mingled with oil drops; here and there some large deep-yellow masses or globules are seen, which refract rather highly. Scarce a single cell, or even nucleus, is to be seen. Along the margins of the lobules and in the portal canals there is a considerable quantity of free oily matter. The addition of liquor potassæ produces an abundant formation everywhere of small rod-shaped crystals, which tend to form crosslets; often, however, the limbs of the cross are more nearly parallel than at right angles: these are probably margarine or margaric acid. The ducts were dissected out: only one is seen terminating apparently by a closed extremity, which is pretty evenly rounded; it consists of obscurely visible nuclei, lying in a sub-granular basis, which also contains very many opaque rather large globules, resisting acetic acid, and whitish by direct light. Similar globules are strewn about in the canal or fissure, *i. e.*, in the surrounding material. A blood-vessel accompanying a large duct is covered with network of streaks, formed by rows of similar globules; these are spread over the vessel and in the neighbourhood, and also along the sides of a translucent canal accompanying a branch of the vessel; they are doubtless lymphatics. Some of the ducts are remarkably bulged at their sides, and infarcted; their nuclei are generally somewhat altered from their natural aspect, and the intervening substance is tinted yellow. This liver contained no sugar, by Trommer's test.

I regret very much that this specimen was not examined for cholic acid; it would have been very interesting to know whether any of the special organic constituents of the bile could be discovered amid all the prodigious quantity of accu-

mulated pigmentary matter. The alteration which the ducts had undergone was very remarkable, and showed that their elaborating action must have been almost, if not entirely, arrested. The engorged state of the lymphatics seems to indicate that they had been taking upon themselves the function of the ducts, or endeavouring, at least, to do so. The globules, which rendered them so unwontedly distinct, consisted, I believe, of some concrete oily matter.

The second case was that of a person who died with diseased kidneys, peritonitis, and slight pericarditis, with diseased aortic valves. The urine had been albuminous, and pleurisy, with effusion, had occurred on the right side. There was no jaundice; the bile in the gall-bladder was dark and thin; the capsule of the liver was thickened in patches. There was some old cretaceous tubercle in the upper lobe of the right lung. There were one or two white patches on the pericardium, which contained some fluid and shreds of lymph.

The liver was very soft and flabby, the capsule perhaps a little thickened; it was very full of blood. All the cells were more or less altered; some, I think the central ones, were mere masses of yellow matter, others were quite broken up into a granular detritus, mingled with very numerous oil drops. The *déperissement* of the cells was by far the most striking circumstance, and had certainly occasioned the lax and flabby state of the organ. The fibroid tissue was not materially increased. I could find no trace of the minute ducts,—they seemed to have perished.

This case cannot, I think, be regarded in any other light than as an instance of rapid degeneration taking place in the liver. The remote cause of this was probably the dyscrasia of the blood induced by the renal disease; the immediate cause must be mere matter of conjecture.

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List of Cases in which more or less of thickening and condensation of the Glissonian sheaths or capsule of the liver was observed, and in which the presence or absence of similar changes in other parts is noted. The number of

cases analysed amounted to 74, out of these 30 were the subjects of the change in question.

- CASE 2. Glissonian sheaths thickened, capsule of liver opaque. Valves of heart rather opaque, kidneys granular, fibrous tumour in uterus.
- „ 3. Liver firm and tough. Glissonian sheaths extremely dense and semi-fibrous, encroaching on the obules in some parts. Valves of heart (aortic) thickened, one adherent to side of aorta. Kidneys heavy, capsules adherent, texture firm. Spleen firm. Tubercular cavities contracted.
- „ 5. Glissonian sheaths thickened, liver fatty. Uterine cancer.
- „ 8. Liver in an early stage of cirrhosis. Glissonian sheaths condensed, patches of thickening in the capsule. Renal capsules adherent.
- „ 11. Liver dense, Glissonian sheaths thickened. Mitral valve thickened. Kidneys remarkably dense and hard. White spot on pericardium. Apices of lungs puckered.
- „ 17. Capsule of liver considerably thickened in patches. Kidneys cysted, everted, granular.
- „ 18. Capsule of liver a good deal thickened in parts, and sprinkled over with minute fibrinous nodules. Kidneys infarcted, some of their inner tufts compressed. Old universal adhesions of right pleura.
- „ 19. Capsule of liver and Glissonian sheaths somewhat thickened. Kidneys small, dwindled, granular.
- „ 21. Liver fatty, with incipient cirrhosis. Kidneys large, infarcted, mottled. Vomicæ and tubercles in lungs.
- „ 22. Liver enlarged, surface puckered, Glissonian sheaths increased, encroaching on the lobules. Kidneys somewhat granular. Spleen firm.
- „ 24. Glissonian sheaths rather thickened. Kidneys infarcted with much oily matter. Capsules of spleen thickened.
- „ 27. Glissonian sheaths somewhat thickened, liver unusually dense. Kidneys dense in texture, rather shrunk, capsules adherent. Visceral pericardium rather opaque, and dotted over by fibrinous granules.
- „ 32. Liver unnaturally dense, slight increase of Glissonian fibroid tissue. Kidneys firm, tubes infarcted, pleurisy with false membranes.
- „ 40. Liver contained two or three fibrinous nodules, adhered to diaphragm. Kidney not healthy, capsule adherent. Tracheal, bronchial, and lumbar glands greatly enlarged, their substance was of an homogeneous granular aspect, not tuberculous, more like fibrinous matter. Lungs contained masses of crude tuberculous matter, yet not quite resembling ordinary tubercle; I should consider it of an intermediate nature between tubercle and plastic effusion. A white patch on the pericardium.

- CASE 44. Glissonian sheaths thickened, capsule of liver thickened, its edges rounded. Kidneys shrunk, granular, cysted. Both pleuræ thickened, or covered by false membranes. Pericardium thickened. Capsule of spleen considerably thickened. Parietal peritoneum thickened in parts.
- „ 45. Glissonian sheath rather thickened. Kidneys infarcted, tubes containing moulds.
- „ 47. Glissonian sheaths thickened, capsule puckered at one part. Aortic valves thickened. Chronic thickening of right pleura. Left pleura obliterated. Induration of pulmonary apices around tubercles, some masses of these enclosed in a fibroid cyst. Tricuspid valve a little thickened. Kidneys not healthy, containing cysts.
- „ 48. Glissonian sheath thickened, liver fatty. Kidneys rather infarcted, capsules somewhat adherent.
- „ 49. Liver rather large, its capsule considerably thickened. Glissonian sheaths of pericardial canals thickened. Kidneys coarse, tubes infarcted, capsules unduly adherent. Capsules of spleen thickened. Chronic thickening of pericardium. Peritoneum thickened generally. Mitral and tricuspid valves thickened in spots.
- „ 51. Liver nutmeg, fibroid tissue of pericardial canals thickened. Valves a little thickened. Kidneys large, coarse, capsules unduly adherent.
- „ 54. Liver nutmeg, fibroid tissue in portal canals and fissures thickened and condensed. Kidneys coarse, tubes infarcted. Mitral and tricuspid valves a little thickened. A little sub-pleural fibrinous exudation with condensation around a small cretaceous mass.
- „ 55. Glissonian sheaths thickened. Kidneys coarse, cortical tubes infarcted.
- „ 57. Glissonian sheaths greatly thickened, encroaching on lobules, which themselves seem to be invaded by a solidified substance. Kidneys certainly degenerating, capsules very adherent. Pericardial white patch, some recent pericarditis. Mitral orifice greatly contracted. Aortic and tricuspid valves slightly thickened. Capsule of spleen somewhat thickened.
- „ 58. Glissonian sheaths rather thickened. Died of scarlatinal dropsy.
- „ 59. Liver covered with old and recent false membranes. Glissonian sheaths thickened in parts. Lobules seem penetrated by a fibrous basis substance. Kidneys not healthy, structure confused. Right pleura obliterated. Slight recent peritonitis.
- „ 60. Glissonian sheaths slightly thickened. Kidneys coarse, tube infarcted.

- CASE 67. Glissonian sheaths somewhat thickened and condensed. Aortic and mitral valves thickened, condensed, and stiffened; mitral orifice somewhat contracted. Fibrinous deposits in spleen and kidneys. A fibrous tumour in fundus of uterus. Pericardium adherent.
- „ 69. Glissonian sheaths much thickened, capsules thickened considerably in two or three patches. Kidneys coarse, large, surface markedly granular. Surface of lungs puckered from induration around tubercles. Mitral and tricuspid valves thickened. Spleen enlarged, firm, its capsule thickened.
- „ 73. Glissonian sheaths thickened, capsule slightly rough. Kidneys large, tubes infarcted.
- „ 74. Glissonian sheaths much thickened, capsule thickened by a white patch in one part, in another the surface drawn in deeply. Considerable chronic thickening of the arachnoid. Granular disease of the kidneys.

One important deduction which may be drawn from this Table is the very great frequency, almost constancy, with which thickening or condensation of the fibrous structures in the liver is associated with actual degeneration of the kidney, or some approach to it. Out of the 30 cases, 26 exhibit this association.

The following list contains a summary of the various diseased conditions, coincident with which fatty degeneration, partial or complete, occurred :

1. Fatty degeneration complete; margins of lobules most affected. Faecal abscess of caecum; extreme emaciation.
2. Ditto incomplete. Phthisis; cavities; granular kidney; albuminuria.
3. Ditto far advanced. Ascites; false membranes covering peritoneum and liver; pneumonia.
4. Ditto partial, affecting margins of lobules. Fever, symptoms resembling those of delirium tremens; pneumonia; hepatisation.
5. Ditto complete. Pneumonia; hepatisation.
6. Ditto partial, margins affected. Sudden death; heart's tissue degenerated.
7. Ditto partial, marginal. Hypertrophied heart; granular kidney, containing some cysts.
8. Ditto partial, marginal. Fever; pneumonia; kidney degenerated.

9. Fatty degeneration partial, affecting exterior half of lobules. Kidney granular, cysted; heart's tissue in a state of fatty degeneration; blood fluid.
10. Ditto partial, marginal. Chronic empyema.
11. Ditto complete. Scrofulous disease of hip; extreme marasmus.
12. Ditto partial, slight marginal, rather oily accumulation. Menorrhagia; extreme anæmia.
13. Ditto partial, marginal. Fever, with head symptoms.
14. Ditto partial, marginal. Suppuration in sub-mucous tissue about epiglottis.
15. Ditto partial, slight marginal. Kidney granular and cysted. Death from injuries from a horse.
16. Ditto advanced state. Encephaloid disease of liver, testicle, lungs, &c.
17. Ditto advanced condition, combined with incipient cirrhosis. Phthisis; renal tubuli infarcted.
18. Ditto partial, slight marginal. Fatty degeneration of kidneys; cerebral affection, with dropsy after scarlatina; tuberculated bronchial glands; miliary tubercles in lungs.
19. Ditto partial, marginal. Maculated fever; kidney not healthy.
20. Ditto advanced stage, margins most affected. Psoas abscess; scrofulous caries of vertebræ; kidney to some extent degenerated.
21. Ditto very advanced stage, associated with partial cirrhosis. Tuberculisation of lungs, not far advanced; fatty condition of kidney; urine albuminous. Died comatose.
22. Ditto partial, slight marginal. Ovarian tumour; hydrothorax.
23. Ditto complete. Circumscribed abscess in peritonæum; cretaceous tubercles in lungs; emaciation.
24. Ditto marginal, slight. Abscess in pelvis; peritonitis.
25. Ditto not quite complete in exterior two thirds of lobules; cells gorged with oil, and breaking up. Bed-sores and abscesses, sequelæ of rheumatic fever; great emaciation.
26. Ditto far advanced, but cells not much broken up; those on margins most affected. Sores and secondary abscesses, after fever; pleural effusion; great emaciation.

27. Fatty degeneration partial, marginal. Acute tuberculisatation of lungs; vomicae; stupor aspect.
28. Ditto partial, marginal. Dropsy after scarlet fever; sub-arachnoid and ventricular effusion; recent pleuritis; anæmia marked.
29. Ditto partial, marginal. Extreme dilatation of bronchi.
30. Ditto partial, marginal. Ovarian tumour, multilocular and solid; emaciation.
31. Ditto general, advanced stage; margins most affected. Incipient granular kidney; dilatation of heart; dropsy.
32. Ditto general and advanced; margins most affected. Acute tuberculosis; pneumonia; prostration.
33. Ditto morbid oily *accumulation* in central half of lobules. Continued fever 16 days; intestine ulcerated.
34. Ditto partial, marginal. Meningitis; pleuritis; abscesses in lungs and liver; injury to head.
35. Ditto partial, marginal, advanced, associated with cirrhosis. Heart enlarged, dilated, flabby; general dropsy.
36. Ditto advanced, but not quite general; associated with cirrhosis. Albuminuria; toxæmia.
37. Ditto partial, marginal. Recent acute pericarditis; diseased kidney; enlarged heart; pleurisy; pneumonia.
38. Ditto very advanced, without breaking up of cells; associated with some cirrhosis. Cerebral affection; meningitis, from inflammation of bones of cranium.
39. Ditto central, oily accumulation. Diseased kidneys; bronchitis; hypertrophied heart; pulmonary apoplexy.
40. . . Ditto marginal, or more general. Died with cerebral symptoms; lungs full of miliary tubercles.
41. Ditto marginal, very advanced. Died with some congestion of pia mater and hæmorrhagic effusion at base of brain; kidneys granular and cysted; heart enlarged; dropsy.
42. Ditto marginal, with some cirrhosis. Incipient granular kidney; diseased valves of heart; blood fluid; dropsy.
43. Ditto marginal; a broad zone of oily accumulation. Phthisis; large vomicae; extreme anæmia.
44. Ditto complete, yellow stained. Died with fracture of pelvis, shock to system proving fatal.

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| 45. | Fatty degeneration | complete. Long-standing peritonitis; pneumonia; fatty heart; long suffered from debility and diarrhœa.   |
| 46. | Ditto              | complete. Phthisis; kidneys healthy.   |
| 47. | Ditto              | complete. Phthisis; kidneys healthy.   |
| 48. | Ditto              | complete, universal; associated with slight cirrhosis. Kidneys not healthy; death from unhealthy sup-<br>puration after removal of scirrhus tumour from<br>breast. The abscess formed in left thigh. |
| 49. | Ditto              | complete. Paralysis from non-inflammatory soften-<br>ing of spinal cord; no other disease.   |
| 50. | Ditto              | marginal. Tuberculosis of lungs and other organs<br>in a boy.  |

The conclusions which may be deduced from the fore-  
going Table are—

1. That partial marginal fatty transformation of the lobules of the liver is peculiar to no pathological state, and can hardly be considered morbid.

2. That out of 20 cases of very advanced or complete fatty degeneration, 15 had no connection with pulmonary phthisis.

3. That in about 8 of the 20 advanced cases there was, in all probability, great emaciation; but that in the majority this had not taken place to any great extent.

4. That out of 20 cases of completely fatty liver, only 3 were associated with granular kidney; and in 1 only was there the coincidence with fatty kidney.

5. That of 30 cases of partial fatty transformation, there were 7 associated with granular kidney; but this seems only an accidental coincidence.

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*Postscript*, August 14th.—In one or two instances since the above was written, I have not found the adminis-  
tration of calomel produce any marked quantity of yellow  
matter in the liver cells. This cannot invalidate the  
positive results of the above experiments, but only shows  
that the action of the drug is not always identical, which  
is not more than might have been expected when various  
disturbing causes are taken into consideration.

ON SOME OF THE  
PRINCIPAL EFFECTS RESULTING FROM THE  
DETACHMENT OF FIBRINOUS DEPOSITS  
FROM  
THE INTERIOR OF THE HEART,  
AND THEIR MIXTURE WITH THE CIRCULATING BLOOD.

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COMMUNICATED BY  
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Received April 12th.—Read May 25th, 1852.

THAT the fibrinous principle of the blood may, under certain circumstances, separate from the circulating fluid during life, and be deposited within the vascular system, especially on the valves of the heart, is a fact so clearly established and so generally admitted, that I need only, at the outset of the communication I have the honour to present to this Society, allude to it as a settled truth, and refer, for the proofs, to the various general works on diseases of the heart and blood-vessels, and to such special essays on the subject as those of Dr. Burrows<sup>1</sup> and Dr. Hughes.<sup>2</sup> From these sources may also be gathered nearly all that is yet known respecting the various conditions under which the deposition of fibrine takes place, and the several forms which the deposits assume. Into these general details I do not purpose entering, my object being simply to consider the effects which the deposits may produce on the system at large. It may, however, be premised that the forms of fibrinous concretions to

<sup>1</sup> Med. Gaz., vol. xvi, 1834-5.

<sup>2</sup> Guy's Hosp. Reports, vol. iv, 1839.

which my observations chiefly apply, are, first, the masses usually described as Laennec's globular excrescences; and, secondly, the granular or warty growths adhering to the valves and presenting innumerable varieties from mere granules to large irregular fungous or cauliflower excrescences projecting into the cavities of the heart.

Avoiding all discussion concerning the origin of these latter growths, I proceed at once to state that in whatever way they may originate, they are, when once formed, full of peril, and often remain so even long after the circumstances which gave rise to them have passed by. If of large size and only loosely-adherent, as they often are, one or more masses of even considerable magnitude may at any time be detached from the valves and conveyed with the circulating blood until arrested within some arterial canal which may be completely plugged up by it, and thus the supply of blood to an important part be suddenly cut off, and serious, even fatal results ensue. Or, the deposits on the valves may be detached in smaller masses, and pass on into arteries of much less size, or even into the capillaries, where, being arrested, they may cause congestion, followed by stagnation and coagulation of the blood, with all the subsequent changes which blood coagulated within the living body is liable to undergo. In this way are probably induced many singular morbid appearances often observed in internal organs, and rarely well accounted for. Again, the masses of fibrine may soften, break up, and discharge the finely granular material resulting from their disintegration; and this, mingling and circulating with the blood, may give rise to various disturbances indicative of a contaminated state of this fluid, producing symptoms very similar to those observed in phlebitis, typhus, and other analogous blood-diseases. In one or more of these several ways, and probably in others not yet clearly recognised, fibrinous material detached from the valves, or any other part of the interior of the heart, may be the cause of serious secondary mischief in the body.

It appears unnecessary to insist here on the possibility of any of the various forms of fibrinous deposit found within

the heart being detached either spontaneously or by the mere force with which the current of blood passes over the surfaces on which they are placed. For it is well known that after death a very gentle force, sometimes even the slightest touch, will loosen and dislodge both small granular particles and masses of considerable size from the valves and inner surface of the heart. Not unfrequently, indeed, lumps of old laminated fibrine of even considerable magnitude are found loose in the cavities of the heart, having probably dropped off before death; and sometimes a mass of this kind may be found some distance along the aorta or pulmonary artery.

It is clear, then, that such fibrinous deposits may admit of being very readily detached, and it must be equally clear that once floating freely in the blood they are exposed to the almost certain consequence of being transmitted with this fluid, and stopped at the first vessel too narrow to allow of their transit.

The parts of the vascular system within which these transmitted masses of fibrine may be found will of course depend, in great measure, upon whether they proceeded from the right or left side of the heart. Thus if they have been detached from either the aortic or mitral valves, they will pass into the blood propelled by the left ventricle into the aorta and its subdivisions, and may be arrested in any of the systemic arteries or their ramifications in the various organs, especially those which, like the brain, spleen, and kidneys, receive large supplies of blood directly from the left side of the heart.

If, on the other hand, the fibrinous masses are derived from the pulmonary or tricuspid valves, the pulmonary artery and its subdivisions within the lungs will necessarily become the primary if not the exclusive seat of their subsequent deposition. A division of the subject being thus naturally formed, I propose to embody the remarks I am about to submit to the Society under two principal heads, considering—

1st. The remote effects resulting from the separation of

fibrinous or analogous deposits from the valves or interior of the left side of the heart ; and

2d. The corresponding effects produced by the detachment of like deposits from the valves or interior of the right side of the heart.

## PART I.

*On the effects which may result from the separation of fibrinous deposits from the valves or interior of the left side of the heart, and their circulation with the systemic blood.*

In endeavouring to elucidate this part of the subject, I beg to draw attention, in the first place, to instances in which it seems probable that masses of considerable magnitude have been detached from the left side of the heart, and subsequently arrested in an arterial channel of notable size ; secondly, to some of the effects which seem to ensue when smaller arterial vessels or capillaries are similarly blocked up ; and, thirdly, to circumstances which make it probable that, not unfrequently, the introduction of particles of fibrine into the circulating blood gives rise to constitutional symptoms indicative of a poisoned state of this fluid.

1. The first three cases which I shall offer are in many respects identical ; for in each death seemed to ensue from softening of the brain, consequent on obliteration of one of the main cerebral arteries by a mass of fibrinous material, apparently derived directly from warty growths on the left valves of the heart.

CASE 1.—Margaret Shaw, æt. 34, a pale, weakly-looking woman ; admitted into St. Bartholomew's Hospital, under Dr. Roupell, about the middle of July, 1850, on account of pains in her lower limbs, and general debility. A loud systolic murmur was heard all over the cardiac region. No material change ensued in her condition until August 7th, when, while sitting up in bed eating her dinner, she suddenly fell back as if fainting, vomited a little, and when

attended to was found speechless, though not unconscious, and partially hemiplegic on the left side. The hemiplegia increased, involving the left side of the face as well as the limbs, and gradually became complete in regard to motion, while sensation seemed to remain unimpaired. She continued speechless and hemiplegic, but without loss of consciousness, for five days, when she quietly died.

On examining the body, six hours after death, the skull and dura mater were found natural; but the small vessels of the pia mater were much congested, the congestion amounting, in some places, almost to ecchymoses. The right corpus striatum was softened to an extreme degree, being reduced to a complete pulp of a dirty greyish-white tint, and without any remains of its characteristic striated structure. The corresponding optic thalamus was healthy; but a condition of pale softening, similar to that affecting the corpus striatum, existed also to a considerable extent in the posterior lobe of the right cerebral hemisphere. The rest of the cerebral substance of this hemisphere was softer than natural, and appeared to contain less blood than ordinary. All other parts of the brain were healthy. The right middle cerebral artery just at its commencement was plugged up by a small nodule of firm, whitish, fibrinous-looking substance, which, although not adherent to the walls of the vessel, must have rendered its canal almost, if not quite, impervious. With the exception of a speck or two of yellow deposit in their coats, the rest of the vessels at the base of the brain were healthy and filled with dark blood.

The heart was enlarged; on its exterior were several broad white patches of old false membrane. The right cavities and left auricle contained recent separated coagula; the fibrine firm and whitish. The right valves were healthy; so also were the aortic, with the exception of slight increase of thickness. The mitral valve was much diseased, the auricular surface of its large cusp being beset with large warty excrescences of adherent blood-stained fibrine. There were a few scattered deposits in the coats of the aorta. The right common iliac artery, about an inch above the

origin of its internal branch, was blocked up by a firm, pale, laminated coagulum, which extended into the internal iliac, and for about a quarter of an inch down the external iliac, where it terminated rather abruptly. The lower portion of the coagulum was colourless, and softer and more crumbling than the upper, which was also more blood-stained and laminated. There was no adhesion of the coagulum to the walls of the vessels. No similar clot existed in the iliac vessels on the opposite side. The pleuræ were adherent in places; the lungs œdematous, and in places solidified by compact greyish-white masses, such as might result from uncured pneumonia. The pulmonary vessels were free from old coagula.

The liver and intestinal canal were healthy. The spleen was large, pale, and soft. One large portion, about a fourth of the organ, was converted into a mass of firm, yellowish-white, cheesy substance. The kidneys were pale, rough, and granular. Within the cortex of the right were several large masses of yellow deposit, surrounded by patches of redness. The portions of medullary structure passing to these deposits were compact, dryish, and yellow.

In the case just narrated death evidently resulted from softening of a large portion of the right side of the brain; and the cause of this softening appeared to be an imperfect supply of blood, consequent on the middle cerebral artery of the same side being obstructed by a plug of fibrine within its canal. I am not aware that there has yet been recorded a case in which fatal softening of the brain resulted from a cause like this; therefore in itself this case is one of value. That the existence of the fibrinous coagulum within the cerebral artery was the real cause of the changes in the brain, can, I think, scarcely admit of question. The sufficiency of such an obstruction to produce the effects ascribed to it is fully established by the many instances in which disturbance, or complete arrest of function in a part, with subsequent atrophy or disorganisation of its tissue, results from any circumstance which materially impedes or entirely cuts off its supply of blood. Examples of this kind

at once suggest themselves;—such as the weakened and subsequently degenerated heart, when the coronary vessels are diseased by deposits in their coats; the feebleness, atrophy, or even gangrene, ensuing in the whole or part of a limb whose arteries are similarly diseased or obstructed from any other cause; also the impairment of cerebral function and subsequent softening of the tissue of the brain when the cerebral vessels are much diseased. But perhaps the best illustration bearing on the case in question is afforded by the results sometimes observed after ligature of one of the common carotid arteries. Such an operation is not unfrequently followed, almost immediately, by giddiness, loss of speech, and unconsciousness, which may pass on even to fatal coma. When not thus speedily fatal, hemiplegia of the side opposite to that of the ligatured artery may ensue, and death may occur from that cause at a more remote period, while examination after death discloses a greater or less amount of disorganisation, amounting sometimes to gangrene, in the cerebral substance, especially on that side on which the operation was performed.<sup>1</sup> The effects of sudden diminution in the supply of blood to one half of the brain, are strikingly illustrated, too, by a most interesting case recently published in the 'Transactions' of this Society by Dr. Todd,<sup>2</sup> in which syncope, followed by hemiplegia and softening of one side of the brain, resulted from the sudden formation of a dissecting aneurism of the aorta, innominate, and right carotid arteries, whereby the current of blood along the carotid and vertebral arteries on this side was all but completely arrested. Effects such as these, resulting from sudden diminution in the quantity of blood sent to the brain, seem to have been, to a certain extent, imitated in the case just read to the Society, in which a considerable

<sup>1</sup> The whole subject of the effects produced on the cerebral circulation by ligature of the carotid artery has been so thoroughly discussed by Dr. Burrows, in his work on 'Disorders of the Cerebral Circulation,' (pp. 72—9,) that it seems quite unnecessary to add more to the remarks made on this subject in the text.

<sup>2</sup> Vol. XXVII.

part of one cerebral hemisphere, ceasing to receive its due supply of blood, in consequence of obstruction in one of its main arteries, at once failed in its functions, and ultimately became disorganised.

Admitting this explanation of the mischief which ensued in the brain, one is naturally led to inquire into the source of the fibrinous plug found in the middle cerebral artery. The suddenness with which the cerebral symptoms came on made it probable that the blocking up of the vessel was equally sudden, and not the result of a gradual coagulation of blood in this situation. The absence, too, of all appearance of local mischief in the coats of the vessel at the obstructed part, and of general disease of the arterial coats elsewhere, also pointed to some other than a local origin for the clot; and I formed the opinion at the time of the examination, that a portion of the fibrinous growths found on the mitral valve had become detached, and then carried with the stream of blood up the carotid artery, until arrested at the angle whence the middle cerebral proceeds. This explanation, which fits equally well for the origin of the plug impacted in the common iliac artery, appears so reasonable, that it is difficult to doubt its correctness; for, as already remarked, it is quite conceivable that portions of the loosely-adhering masses of fibrine might be readily washed off by the stream of blood continually passing over the valve; and that when once admitted into the circulating current, such portions would necessarily be arrested the moment they arrived at a vessel too small to allow of their transit along its canal.

Before commenting further on this case, or attempting to prove that the yellow masses found in the kidneys and spleen were also closely connected with the fibrinous growths on the mitral valve, I beg to offer the particulars of two other cases parallel to the last.

CASE II.—Louisa Richards, aged 24, a thin, pale young woman, was admitted into St. Bartholomew's Hospital, under Dr. Burrows, in November, 1851, on account of

hemiplegia on the right side, which had ensued suddenly, while at dinner, five days previously. The loss of motion was complete, that of sensation partial. Her intelligence was tolerably clear, though her articulation and memory of words were impaired. She appeared to have been in tolerable health at the time of the seizure, but had latterly been exposed to great privations. On auscultation, a loud systolic murmur was heard at the apex of the heart; the sounds clear at the base. At first the symptoms amended; but in a fortnight headache, vertigo, and increased difficulty of speech returned, and there was no steady improvement afterwards, but increasing emaciation, debility, and unconsciousness until her death, in a state of coma, three months after admission. A few petechial spots appeared on the body a few days before death, together with swelling of the right hand and foot. Throughout its progress, the case was regarded by Dr. Burrows as one of gradually-advancing softening of the left side of the brain; and the evident co-existence of extreme mitral disease invested the autopsy with unusual interest.

Examined 32 hours after death, the body was found extremely emaciated. Numerous minute petechial spots existed on the neck, chest, and extremities, and several dusky-red blotches on the ankles. The skull was thin, light, and deficient in blood. The tissue of the pia mater, over almost every part of the brain, was spotted and mottled by dark-red and pinkish blotches of extreme congestion, amounting in places almost to ecchymoses. In the midst of a few of these engorged patches were streaks of yellowish material, as if the neighbouring tissue was infiltrated with pus; but on microscopic examination the yellowish material was found to consist of multitudes of minute glistening granules, like particles of fat: nothing like pus-corpuscles could be found, and it is probable, therefore, that the yellow material was composed merely of degenerated blood or fibrine. The surfaces of the arachnoid were smeared over by a layer of soft pinkish material, like thin mucilage. There was considerable excess of watery fluid in the cavity

of the arachnoid and in the tissue of the pia mater. The general substance of the brain was soft and watery, and of about ordinary vascularity. The left corpus striatum, and the portion of cerebral hemisphere immediately around it, were reduced to a soft, shreddy, almost diffuent pulp, of a pale greyish or dull white colour. The left optic thalamus appeared of ordinary consistence, as did also the corpus striatum and optic thalamus on the opposite side. The septum lucidum was entire; the fluid in the lateral ventricles pale, rather turbid. No trace of either old or recent hæmorrhagic cyst could be found. The left middle cerebral artery, immediately after its origin, was completely plugged up by a firm, whitish, oval mass, about the size and form of a grain of wheat: this mass was tightly impacted within the vessel, the canal of which it completely obliterated, while it loosely adhered to its interior. The branches immediately beyond the obstruction were reduced to firm, narrow, yellowish or rust-coloured cords. These obliterated vessels were imbedded in the pulpy, diffuent, cerebral substance immediately below and in front of the softened corpus striatum already described. A similar though smaller fibrinous plug existed in the right middle cerebral artery, but did not quite block up the canal of the vessel. There was no trace of atheromatous disease of the arteries of the brain, nor of any other part of the arterial system examined. There were no old coagula in any of the cerebral sinuses, which contained recent clotted and fluid blood.

The pericardium contained a few drachms of clear fluid; there were several white patches of old lymph on the surface of the heart, and a few petechial spots. The heart was much enlarged, especially when contrasted with the general wasting of the rest of the body. The right cavities and valves were healthy; the left ventricle much hypertrophied. The mitral valve was the seat of numerous large fungous or condylomatous growths, consisting of pale, tolerably firm masses of fibrine, heaped up in warty excreescences along the auricular border of the valve, and extending for some distance along the posterior part of the interior of the auricle.

The individual masses of fibrine were of various shapes and lengths, some nearly half an inch long; they were pretty firmly attached to the thick and roughened surface of the valve, yet portions could be readily detached, and, when submitted to pressure, crumbled down beneath the finger. Several of the masses extended among the tendinous cords, which were thickened and united together in bundles; one of the thickened cords was distinctly ulcerated across, while portions of fibrine adhered rather firmly to each of the separated ends.

The right external iliac artery immediately above Poupart's ligament was blocked up by a pale, firm, laminated coagulum, which was loose, yet completely filled up the canal of the vessel, the interior of which was smooth and the coats of natural thickness. The coagulum was about an inch long, beginning and terminating abruptly: externally it was quite pale, while some of the inner laminæ were blood-coloured; in one or two places the interior was hollowed into little spaces, containing a thin reddish-brown pulpy fluid. The right femoral vein was also blocked up by an almost similar coagulum, which extended along the entire course of the vessel into the ham; yet in no part was there any undue adhesion between the clot and the interior of the vein, or any other evidence of inflammation of the vessel. There were no old coagula in any other of the vessels examined; and these included the principal arteries and veins of the left lower and both upper extremities, the common and internal iliacs, the carotid and subclavian arteries, the two venæ cavæ and the main venous branches entering them; also the pulmonary arteries and veins. The blood itself was properly coagulated and separated in the cavities of the heart; yet the fibrine was scanty and pale.

In the pleuræ were a few old adhesions, and several petechial spots scattered over the surface. The lungs were healthy, with the exception of some œdema and congestion of the lower lobes. The mucous membrane of the larynx and trachea presented several petechial-looking spots. Similar spots were also scattered over the peritoneum. The liver

was pale and soft, but healthy. The spleen was much enlarged, and its texture soft; while imbedded within it were numerous various-sized circumscribed masses of solid, yellowish, cheesy-looking substance. In consistence these masses varied,—some being compact and firm, others soft, some almost pulpy. A few of the deposits were quite small, others bigger than walnuts. The existence of old coagula in the branches of the splenic artery was not clearly determined. The kidneys, in general structure, were healthy; yet within the cortex of each were numerous yellow or buff-coloured masses similar to those in the spleen. They were of various sizes, and seemed also to vary in the length of time they had existed, some being compact, yellow, depressed on the surface, and presenting scarcely any appearance of redness at their circumference, while others appeared of more recent date, and were surrounded by a distinct halo of spotted redness. Although existing principally in the cortex, yet streaks occasionally extended from them into the tubular structure of the gland. Examined microscopically, ordinary urinary tubules were found in the neighbourhood of the yellow masses; yet sections of the masses themselves exhibited little else than small narrow canals, apparently blood-vessels, containing multitudes of minute dark particles, similar to those found in the vessels of the pia mater, and apparently consisting of degenerated fibrine. One kidney was injected through the renal artery: the fluid passed readily into those portions of the gland which were free from the yellow masses, yet into the parts where these masses were most numerous not a trace of the injection entered.

The stomach and intestinal canal were healthy, with the exception of a few ecchymosed dots on the mucous membrane of the stomach, and the existence of several congested patches on the peritoneal surface of the small intestine. These latter spots were distinctly caused by engorgement of the extremities of the mesenteric vessels, in which blood seemed to have been arrested some little time before death, for in the interior of the congested spots buff-coloured specks

were clearly observed. No doubt the various petechial-looking spots observed in the different serous and mucous membranes, including that also of the bladder, were of the same nature, consisting of blood stagnant in minute vessels, and subsequently partially decolourised; for in the centre of almost all these spots was a distinct yellow or buff-coloured speck. The uterus and its appendages, as well as other parts not specially named, were healthy.

The principal points of resemblance between this case and the one previously related may be briefly recapitulated. They were, softening of a limited portion of the brain, producing death by hemiplegia; obliteration of the cerebral artery supplying the softened part, the obliteration being caused by an old fibrinous coagulum impacted within, but not adherent to, the interior of the vessel; similar old coagula in one of the iliac arteries; fibrinous deposits in the spleen and kidneys; and the presence of large warty growths on the mitral valve.

There were other minor features of resemblance equally illustrative of the primary cause of all this mischief; but these may be reserved until after the narration of the following case, which affords a no less striking example of the class under consideration:

CASE III.—William Purdy, æt. 24, a gas-fitter, of intemperate habits, was admitted into St. Bartholomew's Hospital, under Dr. Roupell, January 22d, 1852, in a state of extreme emaciation and debility, with sloughs on his back, and hemiplegia of the left side. Both feet and legs were much swollen, while the femoral vein in each groin was found hard, cord-like, and painful on pressure. Several dusky blotches, composed of distended capillaries, were also observed on the right thigh. On auscultation a prolonged, harsh, systolic murmur was heard at the apex of the heart, fading towards the base, where the second sound was clear. It was learnt that three months previously, after exposure to cold, he was attacked with diarrhœa, to which he was subject, and severe pain across the back. He continued ill

and under treatment for about two months, suffering with diarrhœa and obscure pains in his joints, which his medical attendant considered to be rheumatic. At the end of this time he was suddenly attacked with severe pain in the region of the heart, accompanied by palpitation, both of which symptoms were relieved by the application of leeches and blisters, and in a week had almost disappeared; but he still continued too ill to leave his bed. One night, about a fortnight after the commencement of the cardiac symptoms, he suddenly got out of bed, quite contrary to his usual custom, and left the room, apparently for the purpose of relieving his bowels. His wife immediately followed, and found him in a confused, bewildered state, with his left hand and arm paralysed, his face drawn to one side, and his speech impaired. Shortly after being placed in bed the left leg became powerless like the arm, and both continued so until his admission to the hospital a fortnight afterwards, at which time the loss of motion was complete, though sensation was not much impaired. He had complained of headache a few days before the seizure, but at the time of the attack did not lose his consciousness, and he had no fit either previous or subsequent to the paralysis.

The swelling of the ankles had existed about three days previous to admission, having been preceded by pain in each thigh.

For a few days after admission he seemed to rally under the influence of tonics, nutritious diet, and wine, while the pain in the thighs was relieved by the application of leeches over the femoral veins. The amendment, however, was but temporary, and he died in ten days after admission.

An examination of the body was made twenty-eight hours after death. The emaciation was considerable. The lower limbs remained œdematous, especially the left, the foot of which was of a dark, livid colour. The tissues generally were very pale, especially about the scalp. The skull was pale and light. The membranes of the brain were healthy, but pale, while there was a considerable excess of clear fluid in the cavity of the arachnoid and the tissue of the pia

mater. The vessels of the pia mater were unusually deficient in blood, almost empty. The substance of the brain was remarkably pale, soft, and watery in every part; there was no trace of a clot, or any manifest product of inflammation. Impacted within the right middle cerebral artery, just at its origin, was a firm plug of pale fibrinous substance, about the size of a hemp-seed, completely blocking up the canal of the vessel, while the branches immediately beyond the obstruction were narrow, but filled with dark stagnant-looking blood, which had quite a different character to that in the other cerebral vessels. There was no trace of any disease in the coats of the cerebral arteries, and no obstruction in the left middle cerebral. Within the left lateral sinus was a large mass of old dryish colourless fibrine, somewhat adherent to the lining membrane, which was spotted red. A piece of similar fibrine existed also in the left internal jugular, but not connected with the mass in the lateral sinus. The other cerebral sinuses and right internal jugular were free from old coagula. The pericardium was healthy within, but externally it adhered to the left pleura. The heart was about natural in size, but much diseased in its interior, the tricuspid, mitral, and aortic valves being encrusted over with large, firm, warty vegetations. On the tricuspid valve these growths were attached along the auricular surface, just above its free border. They varied considerably in size and number at different parts of the valve; many of the masses consisted of small compact roundish or oval bodies about the size of hemp-seeds, or bigger, attached singly or in clusters to the edge of the valve and to the tendinous cords to which they more or less tightly adhered. In structure they were firm and solid throughout, of a yellowish-white colour, and evidently composed of a dense fibrinous substance. The free border of the mitral valve was thickly studded with a continuous ridge of rough cauliflower-like masses of firm white fibrine, which formed warty excrescences of various sizes and shapes. One mass was nearly as big as a hazel nut, firm, elastic, and solid throughout, and of a mottled yellow and red colour on section.

The aortic valves were studded by a similar crop of smaller warty vegetations. Lying loose in the cavity of the ventricle were several small brownish nodules of old blood-stained fibrine. The muscular tissue of the heart was generally healthy; but just beneath the lining membrane of the left ventricle, and occasionally deep within its substance, were numerous pale yellow or buff-coloured blotches and streaks surrounded by red borders, and having the general appearance of the changes described under the term of capillary phlebitis. The coronary arteries were healthy; so also was the general arterial system, though the aorta and its main branches were very narrow. The principal venous trunks contained recent coagula, but the two external and internal iliac veins, and both femoral veins, were blocked up by old variously-discoloured masses of firm, friable fibrine. These old coagula were very large, and produced great distension of the veins in which they occurred. There appeared to be no disease of the coats of the veins, and the coagula were nowhere adherent to them; and the arteries leading to the lower extremities were free from old coagula.

There was nothing peculiar in the blood generally; the coagula in the right cavities of the heart presented quite ordinary characters. There were a few scattered pleural adhesions. The lungs were generally very oedematous; both lower lobes were consolidated by masses of fibrinous deposit, consisting principally of reddish-brown pulpy material, surrounded by darker portions composed of recently extravasated or stagnant blood. In some parts of the right lower lobe were several collections of greenish thick pus, the majority being about the size of peas, a few as large as a walnut. All the branches of the pulmonary artery leading to the lower lobes, were completely plugged up by old, firm, variously-coloured laminated coagula. The branches going to the upper lobes also contained old coagula, though these were softer, apparently of more recent date, and did not so completely block up the canals of the vessels. The pulmonary veins contained recent coagula. The liver appeared healthy, though pale; and there were no old coagula in any

of the portal or hepatic vessels. The spleen was enlarged to about three times its natural size, and very dark from extreme sanguineous engorgement; its tissue was soft and pulpy, while within its substance were several various-sized circumscribed masses of fibrinous deposit. These masses varied in colour from dirty brown, spotted with red, to bright yellow; and in consistence from that of a firm, friable, cheesy substance, to that of a semi-fluid pulp. One of the collections of pulpy substance was contained in a kind of cyst bounded by the capsule of the spleen; at one point the capsule had given way, and a considerable quantity of the pulpy fluid was found in the peritoneal cavity, and smeared over the intestines. The absence of any signs of peritonitis makes it probable that the escape of this material had taken place either just previous or subsequent to death. There was nothing deserving particular notice in the state of the intestinal canal. The kidneys, though healthy in general structure, were the seat of numerous, large, yellow, fibrinous masses, similar to those in the spleen. In the left, these masses were so abundant and large as almost to replace the entire structure of the gland. All the masses were firm and compact; many of them were surrounded by zones of redness. The main artery of this kidney, from the point of its entrance and along all its traceable subdivisions, was filled up by pale, firm, old fibrine. Similar, though redder, old coagula existed in the renal vein. There were no old coagula in the artery or vein of the right kidney, which, moreover, was much less diseased than the left.

In all essential respects this case closely resembles the two previously narrated. In each there was pale softening of the brain; a plug of fibrine obliterating the canal of one of the main cerebral arteries; masses of fibrinous deposit in the kidneys and spleen; and, which seemed to be the source of the mischief elsewhere, large, warty, fibrinous excrescences on the left valves of the heart.

So many, and yet such rare features of resemblance, cannot fail in demonstrating a very close connection between

the several morbid appearances so exactly reproduced in each case.

Although in the autopsy of the last case it was not particularly noted that the right side of the brain, or any portion of it, was softer than the rest, yet the existence of hemiplegia on the left side, and the softening in each of the former cases being most marked at the parts supplied by the obstructed arteries, leave little room to doubt that in this case also, those portions of brain supplied by the right cerebral artery were more atrophied, though perhaps not manifestly much softer than other parts whose vessels were not thus obstructed.

Besides the existence of fibrinous vegetations on the valves of the left side of the heart, and the formation of fibrinous deposits in other parts freely supplied with blood by the left ventricle, it is worthy of particular attention that in this case there were also warty growths on the tricuspid valve, together with coagula in the pulmonary arteries, and masses of fibrinous deposit in the substance of the lungs. The importance of this fact, in support of the close and direct connection between deposits on the valves of the heart, coagula in the arteries, and fibrinous deposits in various organs, will be again noticed. At present I would allude to it merely in support of the view that the clot in the middle cerebral artery was in this, as in each of the other cases, directly derived from the vegetations on the left valves of the heart.

At first it appears singular that in each of these cases, as also in others I have had the opportunity of seeing, the clot should be found as nearly as possible in the same situation. But a glance at the arrangement of the arteries at the base of the brain, especially in an injected specimen, will make it clear that this point is, of all others, the one perhaps most likely to arrest a solid mass floating in the blood, transmitted to the brain by the internal carotid artery; for, almost directly after its entrance into the skull, the carotid divides into its two main branches, the middle and anterior cerebral, which immediately diverge in almost opposite direc-

tions. The sudden diminution in size, resulting from the division, and the different directions at once taken by the two branches, will together tend to make the angle whence the branches diverge well calculated to arrest any solid body transmitted along the carotid ; while, since of the two branches, the middle cerebral is the largest, and also maintains more nearly than the anterior the original direction of the trunk from which they both sprang, a solid body seems more likely to pass into it than into the anterior division. And such is found to be the case ; for, if the plug is not found sticking directly at the angle, it is found a short distance up the canal of the middle cerebral.

Once arrested at the angle, or within the canal of the middle cerebral artery, a mass of fibrine, if large enough to block up the vessel, becomes at once the cause of loss of function and subsequent atrophy to almost all that portion of the brain supplied by the obstructed vessel ; for, although by the arrangement of the vessels composing the circle of Willis, ample provision is made against obstruction ensuing in any of the main arterial channels of either side *previous* to their arrival at the circle, there is comparatively little provision for an obstruction ensuing in any of the main branches into which this arterial circle breaks up. This remark applies especially to the middle cerebral artery, which, if plugged up at its origin, becomes at once almost useless as a blood-vessel ; for nearly all its divisions, especially those for the central parts of the brain, proceed to their several destinations without receiving any anastomosing branch from the other divisions of the circle of Willis. The truth of this will be evident on examining an injected brain : and the fact at once explains why the portions of brain supplied by the branches of an obstructed middle cerebral artery are deprived of all nourishment, except the little they may receive from the minute inosculation provided by the ultimate divisions of other arterial branches of the circle of Willis.<sup>1</sup>

<sup>1</sup> Since writing the above I find an almost similar remark made by Dr. Todd, in his comments on a case already alluded to. Speaking of the fact of the softening of the brain in that case being limited to that part supplied by the

The anterior cerebral artery is, by means of the anterior communicating branch, in great measure guarded against the occurrence of a similar evil; and in this way may be explained the infrequency of softening of the anterior cerebral lobes compared with the more frequent occurrence of this condition in the parts supplied by the middle cerebral artery.

I trust that the details of the three cases just submitted to the Society will be considered sufficiently satisfactory to establish the two principal points I have been desirous of proving in this part of my communication, namely, that softening of a portion of the brain, with attendant loss of function, may result from obstruction of a main cerebral artery by the lodgement of a plug of fibrine within its canal, and that the foreign substance thus obstructing the vessel is probably not formed there, but is derived directly from warty growths situated on the left valves of the heart.

It has long been admitted that any disease of the cerebral arteries sufficient to impede the transit of a due quantity of blood may induce softening of the brain, from imperfect nutrition. But the diseased state of the vessels to which nearly all observations on the subject apply have reference only to the peculiar fatty or atheromatous condition so frequently presented by the coats of the cerebral arteries, especially in persons of advanced life. And I have been able to meet with very few recorded instances in which distinct fibrinous clots have been noticed blocking up the canal of any of the arteries of the brain: and even when their existence has been noted, the conditions leading to their formation, and the relation which they bear to the attendant cerebral softening, have, so far as I know, never received an explanation similar to that which I now beg to offer.

middle cerebral artery, he says, "this artery is the principal branch of the carotid within the cranium, and has a less free communication with the corresponding ramifications of the opposite side than any of the other arteries of the brain. Hence the parts supplied by it are more apt to suffer than those which are nourished by the other branches of the carotid."—*Med. Chir. Trans.*, vol. XXVII, p. 321.

By further search I might possibly have increased the number of instances in which old coagula have been found by different observers in cerebral arteries, yet since this peculiar affection of the vessels of the brain seems never to have been suspected, it has never been specially sought for, and the part in which it occurs has perhaps rarely been closely examined, the mere absence of general disease of the coats of the cerebral arteries being considered as sufficient proof that the cause of cerebral softening was not dependent on any lesion of these vessels. Yet I feel convinced that had more minute attention been paid to the condition of the middle cerebral arteries, many otherwise obscure cases of white softening of the brain, especially where attended with disease of the heart, would have been cleared up by the detection of some such cause of obstruction as that in the cases I have related; and I trust that future observations will prove this to be a not unfrequent cause of cerebral softening, especially when occurring in young persons. One feels at once inclined to ascribe very many recorded cases of cerebral softening to this cause, and arguments in favour of such explanation readily suggest themselves; but, in absence of direct proof, one must, of course, remain satisfied with the mere supposition that such explanation is correct, waiting for future investigations to determine the comparative frequency of this affection of the cerebral vessels in cases of pale, non-inflammatory softening of the brain.

It is probable, too, that many cases of partial and temporary paralysis suddenly ensuing, in one or more limbs, in young persons, especially if accompanied with signs of cardiac disease, may be due to interruption of a due supply of nutriment to the brain by the temporary plugging up of a principal cerebral artery by fibrine detached from a diseased valve on the left side of the heart. Temporary loss of power in one or more limbs is not an uncommon circumstance in young persons affected with heart-disease. A good example of this class of cases was furnished by a pale, delicate girl, admitted into St. Bartholomew's Hospital, in

1849, under Dr. Roupell, with pain and weakness in both right limbs, numbness of the back of the right hand, and flexion of the fingers of the same extremity: these symptoms being of about a month's duration. Over the semilunar valves at the base of the heart, was plainly audible a double endocardial murmur; and this persisted all the time the girl was under notice. Many such cases of partial hemiplegia in young nervous women, are no doubt rightly attributed to hysteria; yet, on the existence of such distinct evidence of cardiac disease as that furnished by a double endocardial murmur, it would scarcely be right to deny to such affection of the heart some share in the production of the paralytic state. In what way the cardiac disease may induce the symptoms of paralysis in such cases, must perhaps always be matter of doubt; yet it seems not unreasonable to infer, that the cardiac murmur may be due to fibrinous deposit on the valves, and that portions of this deposit may have been detached, and subsequently arrested in the cerebral vessel supplying that part of the brain whence the paralysed limb derives its nervous influence.

Although the arrest of a plug of fibrine within the canal of a cerebral artery would naturally tend to impairment of function and atrophy of the portion of brain supplied by the obstructed artery, yet it is conceivable that such clot may ultimately soften, break up, and be removed, and thus the vessel become permeable again; or, as suggested to me by Dr. Burrows, it may sometimes happen that the coats of the artery may, by the pressure behind, be sufficiently dilated around the clot to allow of the transit of some blood along the canal. In some such way may, perhaps, be explained the recovery sometimes observed in certain cases of partial paralysis, apparently dependent on softening, or other structural disease of the brain. But, probably, in the majority of cases, the coagulum once firmly impacted within the vessel, will tend to form an organised adhesion to the walls, and so produce permanent obliteration of the canal. In consequence of the obstruction thus produced, the blood, continually impelled up to the obliterated part, will natu-

rally tend to induce distension of the coats of the vessel immediately behind the seat of obstruction. And it may be a question, whether many of the aneurismal pouches found in the cerebral arteries, may not originate in this way. In favour of such a view may be mentioned the facts, that the origin of one or other middle cerebral artery is the most frequent seat of such aneurisms; that they are commonly found uncombined with any disease in the coats of the rest of the cerebral arteries; that they are not unfrequent in young persons, in whom general disease of the arterial system is rare; and that in many instances they are found associated with valvular disease of the left side of the heart.

As might be supposed, the arterial branches, at the base of the brain, are by no means the only arteries in which fibrinous masses, detached from the valves of the left side of the heart, and mingled with the circulating stream, may be arrested. In Cases I and II coagula were found in the iliac and femoral arteries, and in Case III in the renal; and in each of these cases the coagula were, in all probability, derived from the same source as that which furnished the clot in the middle cerebral artery, namely, the warty masses on the mitral valve. Many specimens, put up in museums, and supposed to illustrate the spontaneous coagulation of blood, or the deposition of fibrine, within limited portions of an arterial trunk, are probably to be referred to the same origin. One, in the museum of St. Bartholomew's Hospital, is probably of this nature: it consists of a portion of a femoral artery, which, with the commencement of the profunda, is blocked up by a coagulum of firm, pale, laminated fibrine. There is nothing in the appearance of the coats of the vessel which make it in the least probable that they had induced coagulation of the blood, no thickening, no roughening of the interior, and no particular adhesion of the clot to the lining membrane, while it is also stated, that there was no disease in any other part of the arterial system. The source of this coagulum should, therefore, be sought for elsewhere; and I think it may be referred to the heart, for "the valves of the aorta were in part destroyed by ulcera-

tion, and there was a growth of soft, vascular fungus from their edges." It is of course easily conceivable that a portion of this soft, warty growth might have been detached, and carried to the part of the artery where it was subsequently found. The limb from which this artery was taken became, without any evident cause, pulseless and cold, some time before death.<sup>1</sup> Dr. Hughes<sup>2</sup> quotes a case from Legroux, very parallel to this:—a woman, who had suffered with symptoms of cardiac disease, was suddenly seized with paralysis, and loss of sensation in the left arm, terminating in gangrene of the part. On her death, which occurred suddenly, eighteen days afterwards, the brachial and ulnar arteries were found plugged up by old pulpy granular fibrine; while, together with an extremely diseased mitral valve, "a concretion of exactly the same colour, texture, and consistence was discovered in the left auricle." Viewed in connection with the previous cases, the inference in this case seems natural, that the coagula in the arteries of the arm had their origin in one or more masses of fibrine, formed within and detached from the interior of the heart. The suddenness with which the paralysis of the arm ensued, is also quite calculated to favour this view, although I ought to state that a different explanation is given by Dr. Hughes, who considers the clots to have originated in the parts where they were found. Cases of this kind might readily be multiplied: and I think that, for the majority of them, the source of the coagulum found in the arteries might be ascribed to portions of fibrine detached from the valves of the heart, and carried bodily to the vessels in question.<sup>3</sup>

<sup>1</sup> Catalogue of the Anatomical Museum of St. Bartholomew's Hospital, vol. i, series 13, No. 22. In his valuable work on 'Diseases of Arteries,' Mr. Hodgson (p. 18) mentions the particulars of a case so exactly identical with this that I cannot but think they both refer to the same subject.

<sup>2</sup> Guy's Hospital Reports, vol. iv, p. 161.

<sup>3</sup> Although in the text I have spoken of the fibrinous coagula found in the large arteries as having been probably brought thither in mass from the heart, yet I should also add, in explanation of the laminated structure they sometimes present, that the size of the mass originally detached from the

As bearing closely on this as well as other parts of the general subject under consideration, I may quote a few particulars from the case of a young woman, whose heart is preserved in the museum of St. Bartholomew's Hospital.<sup>1</sup> In the left ventricle of this heart is a large aneurismal pouch, filled by a pale, fibrinous laminated coagulum, portions of which hung into the cavity of the ventricle. For eighteen months the patient had suffered from palpitation and other signs of disordered circulation. About four months before death, she lost the use of the left arm: from this she recovered; and then the left leg became similarly affected, and was at the same time swollen and painful. This also nearly got well, and then she lost the use of the right leg; which, in turn, gradually recovered. Presently, however, the left leg again became much swollen and œdematous, and the skin affected with an erysipelatous inflammation. On the subsidence of this, the patient had an attack like fever; on recovering from which there was a recurrence of paralysis in both left limbs, succeeded shortly by convulsions, of which she had several attacks, at various intervals, and ultimately died in one. The body was subsequently examined by Mr. Paget; the brain was found soft, with rather deficient vascularity of itself and its membranes, and there was an old cavity containing clear fluid in the right corpus striatum. The spinal cord was healthy throughout. With exception of the heart, spleen, and kidneys, all the other parts examined were healthy. Within the spleen were several circumscribed deposits of yellow ochre-coloured substance; and one of the main branches of the splenic artery was nearly

heart, and arrested at an angle or recess of an artery, was probably much smaller than that of the coagulum subsequently found in the vessel, the increase in size having probably taken place gradually by the successive deposition of fresh layers of fibrine on the nucleus formed by the original mass.

The formation of laminated coagula in the corresponding veins in some of these cases is probably due, in great measure, to the slowness with which the blood will move along the veins when relieved from the pressure of the arterial current, which will be so greatly diminished by the obstructing plug within the vessel.

<sup>1</sup> Catalogue of the Museum, vol. i, series 12, No. 55.

filled by a firm and dark laminated coagulum adhering closely to its walls, and having internally some yellow substance like that in the spleen itself. In the cortex of each kidney were several deposits of various size, consisting of a firm, yellow substance like solid pus, surrounded by a vascular areola. Within the thin muscular wall forming the outer boundary of the aneurismal pouch in the heart, "were a number of small yellow ochre-coloured deposits, just like those found in the spleen."

The fibrinous deposits in the kidney, the spleen, and the splenic artery were, in all probability, derived from portions of fibrinous clot detached from the interior of the cardiac aneurism, and transmitted with the circulating blood to those parts in which they were found. It is also not unreasonable to infer that some, at least, of the strange paralytic and phlebitic symptoms which marked the progress of the case were due to the circulation of other particles of the fibrinous substance, and their arrest in the vessels of the limbs affected with temporary paralysis and signs of phlebitis.

The hemiplegia ultimately ensuing on the left side was probably associated with an affection of the brain; but it is not unlikely that in this, as in other cases, obstruction by means of a portion of coagulum detached from the heart had ensued in the right middle cerebral artery, and induced a state of softening, of which the cavity found in the right corpus striatum was the remains.

2. Having considered some of the principal circumstances apparently connected with the detachment of comparatively large masses of fibrine from the interior of the left side of the heart, I proceed, in the second place, to offer a few observations on some of the effects which smaller portions, similarly detached and arrested in minute arterial branches or in capillaries, appear capable of producing. One of these effects seems to be displayed by the singular masses of yellow fibrinous-looking substance not uncommonly found in the spleen, kidneys, and other organs, and hitherto described under such names as "capillary phlebitis," "metastases," or "fibrinous deposits."

In the details of the three cases already narrated to the

Society, several varieties of these deposits have been rather fully described; and it seems unnecessary, therefore, to offer any further description of them here. They are familiar to all who have seen much of the inspection of bodies after death, and their several peculiarities have furnished subjects of former communication to this Society by Dr. Hodgkin and others. My present object is to show that these morbid appearances are very commonly associated with valvular disease of the heart, especially with those forms of disease attended with the deposition of fibrinous vegetations on the valves; and that in the majority of cases, if not in all, they result from the direct transmission of particles of fibrine from the valves of the heart or elsewhere, and their subsequent arrest in the vessels of the parts in which these morbid deposits are found.

Out of 21 cases in which I have observed these deposits in the spleen, kidneys, or other parts supplied with blood directly from the left side of the heart, and in which I have noted the condition of the heart and other principal organs, I have found disease of the valves or of the interior of the left side of the heart in every instance but two; and of these two exceptional cases, one was a case of cholera, in which a doubtful mass of capillary phlebitis existed in the liver, the other a case of aneurism of the aorta,—which, as I shall afterwards show, tends rather to prove than disprove the explanation I offer of the fibrinous masses existing in the various organs. Omitting these two cases, however, I find that of the remaining 19 it is not merely stated that the heart or the valves were diseased in each of them, but that in 14 there were fibrinous growths on the surface of the left valves or interior of the left cavities, while in the remaining 5 there is simple mention of valvular disease, without any statement as to whether fibrinous deposits existed or not.<sup>1</sup> The mere fact of so large a number of cases of so-called capillary phlebitis in internal organs being distinctly associated with the presence of fibrinous material on the valves of the heart is sufficient to suggest a very close

<sup>1</sup> For similar confirmatory cases see Dr. Jackson (*Med.-Chir. Transactions*, vol. xxix, p. 280,) and Dr. Ormerod, (*Gulstonian Lectures*, *Med. Gaz.*, 1851.)

relation between these two morbid states; and the existence of some such close relation is rendered more probable by the absence, in all these cases, of any other condition likely to have induced a poisoned state of the blood, to the existence of which the formation of these deposits has not unfrequently been ascribed. In many of the cases, cardiac dropsy is noted as the fatal disease, while in none of them does there seem to have been any proof of the existence of a so-called blood-disease, such as typhus, purpura, or the like.

That such blood-diseases have, indeed, nothing to do with the deposits in question seems proved by the fact that, out of the examination of a large number of fatal cases of fever, I have never yet met with an instance in which masses of capillary phlebitis existed in any part of the body in this disease. From their general absence in other diseases, then, as well as from their frequent occurrence in diseases of the heart, we have equally strong reason for believing in the existence of a close connection between these morbid deposits in internal organs and the presence of fibrinous growths on the inner surface of the heart or on its valves.

The close connection subsisting between endocarditis and fibrinous deposits in distant organs has, I am aware, been strongly insisted upon by Rokitansky, and has also attracted the notice of Hasse; therefore it may seem superfluous to have said so much on the subject. But I would plead a two-fold excuse for so doing: first, because, so far as I know, the connection pointed out by Rokitansky has never yet been confirmed, scarcely even recognised, in this country; and secondly, because I believe, with all deference, that it may admit of an interpretation somewhat different from that which Rokitansky has given. After careful and repeated perusal of all I can find bearing on this subject in Rokitansky's great work on Pathological Anatomy, I cannot find that he in any place even hints at the explanation I have ventured to offer of the real cause of the secondary deposits in distant organs in cases of valvular disease of the heart. His observations seem to show quite plainly that he ascribes them to a poisoned state of the blood, consequent on the admixture of the products of endocarditis with this fluid,

whereby it acquires an increased tendency to coagulate, which tendency cannot well be manifested in the arteries, owing to the velocity of the current, but is brought about within the capillaries on account of the slowness with which the blood there moves, and the increased facility which is thus afforded for the morbid material derived from the inflamed heart to exercise its influence on the composition of the blood.<sup>1</sup> The view, however, which I have ventured to take is, that the deposits in the various organs are the direct mechanical results of the arrest of solid particles of fibrine detached from some part of the heart or arteries, and too large to traverse the minute capillary canals to which they are brought by the circulating blood. By the obstruction which their arrest occasions, they may induce coagulation of blood behind them; while, by their mere presence, they may act as local irritants, and so induce secondary processes of inflammation and suppuration, like any other foreign body. In either or both of these ways may be produced the various appearances characteristic of these singular deposits. This view, which seems supported by the other evidence I have adduced of the direct transmission of masses of fibrine from the valves of the heart, has the advantage, too, of explaining some of those cases in which very similar fibrinous deposits are found in various organs, independent of any warty or other growths within the heart. For example, in a fatal case of aneurism of the abdominal aorta, to which I have already alluded, several patches of capillary phlebitis existed in one of the kidneys, though for the origin of these there seemed to be no other explanation than that afforded by the existence of fibrine abundantly deposited in laminated masses within the sac of the aortic aneurism. It is easy to conceive that portions of such fibrine might be broken up, mingled with the circulating blood, and subsequently arrested within the capillaries of the kidney or spleen. An example even more marked than this was afforded by the case of a man admitted, under Dr. Burrows, in a dying state, in whom, after death, there was found a

<sup>1</sup> Handbuch der Pathol. Anat., Bd. i, s. 242, e. s. Bd. ii, s. 437.

small aneurismal pouch, about the size of a Spanish nut, immediately behind one of the aortic valves. Its interior was lined by old laminated fibrine; and the aortic valves, which were themselves greatly diseased, being thick, hard, and rigid, had their roughened edges and surfaces covered with recent fibrinous fringes. The spleen was enormously enlarged, being upwards of 9 inches long and 6 inches broad: the increase in size was principally due to several large masses of firm, yellow, cheesy-looking substance, one being as big as a good-sized apple. The kidneys were large and firm, and presented on their surface numerous spots of a deep-red colour, in several of which was a yellowish central dot: these changes were manifestly the result of a similar morbid process to that in the spleen, only in an earlier stage.

In this as in the last instance, the mere mechanical detachment of fibrine from an intra-vascular part whereon it was deposited seemed to be the true explanation of the masses of fibrinous substance found in the spleen and kidneys; for in no other way could their origin be reasonably accounted for.

In some few instances, in which masses of capillary phlebitis are found in internal organs, the artery supplying the affected part may be found plugged up by old dry colourless fibrine, as was observed in the renal artery in Case III. When this occurs, it may be a question whether the deposits in the organ do not result from the sudden arrest of a plug of fibrine in the artery, and the consequent coagulation and subsequent change of the blood in the vessels beyond the seat of obstruction. But although this may be the explanation in some instances, yet since the coagula found in the large arteries can usually be traced onwards into their various subdivisions, it seems reasonable in such cases to ascribe the coagula in the various arterial tubes to gradual stagnation of the blood in them, consequent on the more minute vessels being successively blocked up by the entrance and arrest of fresh fragments of fibrine, which though small enough to pass through the arteries, may be too large to traverse the capillaries.

Although, however, there may thus be a doubt in some cases, whether the primary obstruction took place in an artery or in the capillaries, yet in other instances it appears to be quite manifest that the fragments of fibrine have been arrested in the minutest vessels of the affected organ. The ordinary masses of capillary phlebitis are often of large size; but if the tissue of an organ, such as the kidney, in which these large masses are found, be closely examined, the surface will usually be seen presenting reddish spots or blotches of various size and shape, like patches of extreme congestion or even small ecchymoses, while towards their centres these patches frequently exhibit a pale yellowish or buff-coloured appearance, as if the stagnant blood of which they consisted was becoming gradually decolourised at these parts. There can be little doubt that these patches are in their nature identical with, though smaller, and in an earlier stage of transformation than, the large yellow masses with red zones in other parts of the gland. Together with these distinct patches one may also often find in the same organ, spots of such extreme minuteness as to be scarcely visible without a lens: they are mere red dots, like minute petechiæ, yet in the centre of almost every one may be discerned a distinct yellowish or fawn-coloured speck, showing that in nothing but their extreme minuteness do they differ from the larger blotches of capillary phlebitis.

I would direct especial attention to the fact of the co-existence of these minute spots with the large and clearly-discernible masses, for since it seems to prove the identity of the two forms of disease, it likewise makes it probable that the small red spots with their yellowish centres, even when found uncombined with the larger masses, have originated in the same cause which led to their formation in other cases. By thus regarding them as mere modifications of ordinary capillary phlebitis, we seem to obtain an explanation of several otherwise unintelligible morbid appearances, and at the same time advance another step towards the elucidation of various pathological phenomena. Thus in Case II, it was mentioned, that besides the coagula in the cerebral and iliac arteries, and the masses of distinct capillary phlebitis in

various internal organs, minute red petechial-looking spots were found in many parts of the body, namely, the pericardium, pleuræ, and peritoneum, and the mucous surface of the larynx, trachea, stomach, and urinary bladder, and elsewhere; also that nearly all these red spots presented a pale-yellowish or buff-coloured centre. The characters exhibited by these spots was so exactly like, on a small scale, those presented by the ordinary patches of capillary phlebitis with which indeed they co-existed in some of the organs, that their identity was considered unquestionable. Associated too as they were with large friable masses of fibrine on the valves of the left side of the heart, it seems scarcely to admit of doubt that they as well as the larger patches of capillary phlebitis were caused by the coagulation and gradual decolorisation of blood rendered stagnant by the arrest of minute particles of fibrine separated from the deposits on the valves and circulating with the blood. This view of their origin is strongly supported by the results of the direct introduction of minute particles of any material into the blood: for in nearly all such cases similar small congested or ecchymosed spots, with more or less of a yellowish centre, have been found after death in the lungs and other parts. The results of some of M. Gaspard's experiments are especially to the point: thus in one quoted by Mr. Lee,<sup>1</sup> half an ounce of fluid resulting from the decomposition of some beef placed in dog's blood was injected into the jugular vein of a bitch. After death the lungs were found gorged with blood, and they "presented many petechial spots, like small ecchymoses." Similar spots existed also on the left ventricle of the heart, in the spleen, mesenteric glands, gall-bladder, mucous membrane of the intestines, and sub-cutaneous cellular tissue. This, and other analogous experiments, as well as the appearances after ordinary phlebitis, strongly favour the opinion that the ecchymosed spots sometimes found so abundantly in various parts of the body, may result from the arrest of fragments of fibrine separated from warty excrescences on the valves of the heart and circulating in the blood. The numerous parts in which these spots are found

<sup>1</sup> On Phlebitis and Purulent Deposits, 1850, p. 34.

in some cases, clearly indicate that the blood has been highly charged with some such material; and one cannot wonder at the serious and even fatal results which not unfrequently attend such cases, particularly when various organs, including the brain, simultaneously become the seats of these congested spots. The symptoms in such cases are sometimes most obscure, apparently because of the vitiated state of the blood, which produces constitutional effects very similar to those observed in continued fever or phlebitis. This brings me to the consideration of the third series of effects which I stated at the commencement of this paper to result sometimes from the introduction of fibrinous particles into the circulating blood, namely, the manifestation of phenomena like those indicative of the existence of a morbid poison in the blood. The following case, selected from several similar to it, may be narrated as affording a good illustration of this part of the subject.

CASE IV.—Richard Griffith, æt. 14, a healthy-looking boy, but who had been lately badly off and much stunted for food, was admitted into St. Bartholomew's Hospital under Dr. Roupell, Feb. 12th, 1852, with obscure typhoid symptoms, and a petechial eruption on the skin. He was conscious, but gave an imperfect account of himself, and it was only after his death that a clear history of the case was obtained. It was to the effect that he had been in good health until a fortnight before admission, when he began to complain of pain in the right groin; this pain continued without material abatement and without particular affection elsewhere, for about ten days, and then he was suddenly seized with shivering, headache, and pains in the back and calves of the legs, followed by heat, thirst, and general illness. On the onset of these symptoms he was brought to the Hospital and prescribed for,—his condition not being one of such urgency as to call for admission. He continued to attend for two days, and then, at the request of his mother, was taken in, and was put on a plan of treatment suited to an attack of fever, under which he was supposed to be

labouring. He was confused and rather delirious the first night, but was quite rational the following morning, and said he felt ill and thirsty. The second night he was more quiet; and on the ensuing morning, shortly after taking a dose of his saline medicine, he went to sleep, but from this sleep he passed into a half comatose state, in which he continued until his death, about twenty-four hours afterwards.

The body was examined about thirty hours after death; it was rather emaciated, while over every part of the surface were numerous petechial spots, some recent and of a pinkish colour; others apparently older and of a dusky-red hue; the majority of the spots were small, but a few were as big as split peas. The rigidity was universal and very marked; the skull natural; the dura mater healthy. Almost every part of the tissue of the pia mater, including the folds between the convolutions, was infiltrated with what seemed to be recently extravasated blood, which gave a blotchy dark-red appearance to the surface of the brain. In the midst of these red blotches were several yellow or buff-coloured spots and patches of various size; and even when the dark-red spots were very small, the central part had a similar light yellow colour; some of the patches had a greenish yellow appearance, as if smeared over with pus. The brain itself was unduly congested; the blood-vessels on section being numerous, and singularly large and turgid with dark blood; there were a few small spots like ecchymoses near the surface. The cerebral arteries and sinuses were healthy. The pericardium was healthy, except in the existence of several petechial spots on the surface of the heart; the heart itself was of natural size; the right valves healthy. The auricular surface of the mitral valve, just above its free border, presented a ridge or fringe of whitish fibrinous vegetations, which adhered very slightly to the thickened surface of the valve, and when scraped off were found remarkably soft and friable. Large warty masses of similar soft whitish vegetations adhered to the ventricular sides of the "surfaces of contact" of the aortic valves; these deposits were chiefly arranged in little heaps along the lower

festooned border of each cusp, but in places they extended over almost the entire surface of the valve. The central portions of each of the contiguous halves of two cusps were destroyed by ulceration; parts of the ulcerated tissue hanging loose and covered by flakes of fibrine. The general tissue of the heart was healthy, yet the substance of each ventricle, especially on the inner surface, was marked by numerous scattered petechial spots, in the centre of almost every one of which was a small yellow dot. The lungs were generally healthy; there was some congestion of the lower lobes, with puriform mucus in the smaller bronchial tubes. The pleuræ were healthy, excepting several petechial spots on their surface. The spleen was very large, dark and soft; there were several yellow masses of fibrinous deposit near its surface. The kidneys were healthy in texture, yet on stripping off the capsule the surface of each was found studded with minute petechial spots, in the centre of almost every one of which was a small buff-coloured dot; besides these dark red spots there were several large yellowish blotches extending deeply into the substance of the cortex, and surrounded by a reddish halo; between these large masses and the minute petechial dots, were several other stages evidently connecting together these two extreme forms of one and the same morbid condition. No old coagula were found in any of the renal vessels. The intestinal canal was healthy, except that along almost its whole extent the mucous membrane was spotted with petechial and larger ecchymosed patches. Similar petechial spots existed in the mucous membrane of the bladder, of the pharynx, œsophagus, stomach, larynx, and trachea; also on the folds of the peritonæum. Some of the spots from the latter were examined carefully with the naked eye as well as microscopically, and it was observed that the minute vessels about them were gorged with blood, while within several of these distended vessels, solid coarse lumps, apparently of fibrinous matter, were clearly discerned with the microscope. The liver, and other parts not specially named, presented nothing worthy of note.

This was a case full of obscurity from the commencement, and the obscurity increased as the symptoms of cerebral

oppression came on, and proved so rapidly fatal. The lad's depressed languid aspect, with an abundant petechial eruption, seemed to indicate, in the absence of a clear history, the existence of low fever, and the restless, delirious manner in which he passed his first night in the Hospital, favoured this view, and justified the employment of wine and simple salines; yet the fatal coma which rapidly supervened two days after admission, was quite unintelligible on this supposition, and could only be understood by an examination after death.

Then the whole mystery seemed to be cleared up; and the most reasonable interpretation which can be offered of the phenomena observed during life and the appearances presented after death seems to be this:—The pain in the right groin with which the attack set in was rheumatic; then ensued rheumatic inflammation of the mitral and aortic valves, with ulceration of the latter, and deposition of fibrinous vegetations on both. From these fibrinous deposits, many of which were loose and easily detached after death, portions had probably separated during life, and, being mingled with the blood, were transmitted with it to all parts of the body; then, arrested in the capillary networks and smaller arteries, they produced the various petechial-looking spots in the skin and most of the serous and mucous surfaces of the body, the buff-coloured blotches and streaks, and the solid fibrinous masses in the kidneys and spleen, while they probably caused the fatal issue of the case by the pressure resulting from the extreme engorgement of the minute vessels of the pia mater and the substance of the brain.

Viewed by itself alone, this case is of extreme interest; but taken in conjunction with others it seems to possess features of great pathological value, as illustrating the serious effects which may result from direct poisoning of the blood, by the products of rheumatic inflammation of the valves of the heart being mingled with it. In the typhoid symptoms noticed during life, and the secondary deposits found after death, the case presents features almost exactly parallel with those ensuing in phlebitis after wounds. In both cases, indeed, the exciting cause of the morbid phenomena seems to be

nearly the same, namely, the introduction of some morbid material into the blood, and its subsequent transmission with that fluid to various parts of the body. It sometimes happens, too, that in the progress of rheumatic disease of the valves of the heart, the similarity to phlebitis is made more striking by the formation of abscesses in various parts of the body, and the deposition of pus within the joints. A good example of this seems to be furnished by the case of a young woman admitted under Dr. Burrows in February, 1851, suffering from rheumatic affection of several large joints, of three or four weeks' duration. The articular pains ultimately settled in one shoulder, which joint continued to suffer until the patient's death, about two months subsequently. From the period of admission the case assumed an unfavorable aspect, the subsidence of the rheumatism being attended by no improvement in her general condition. In about three weeks, after occasional rigors and a state of almost constant profuse perspiration, a painful swelling formed behind the right angle of the lower jaw, and seemed likely to suppurate; but it disappeared. Then both lower limbs gradually became œdematous, with tenderness in the popliteal space and in the groin. The œdema increased, the patient became more exhausted and hectic, and so died. After death a large abscess was found in the right axilla. Yellowish turbid fluid existed in the left shoulder-joint, the cartilage of the head of the humerus being somewhat ulcerated. The inferior caval vein, as well as both common iliacs and their branches, were blocked up by old decolourised fibrine, the left external iliac vein containing, besides old fibrine, about a teaspoonful of yellowish puriform fluid. There was an old clot in one of the large branches of the pulmonary artery; also several buff-coloured spots of capillary phlebitis on the kidney, and extreme disease of the aortic and mitral valves, one cusp of the aortic and a large patch of the mitral being destroyed by ulceration; while shaggy flakes of soft fibrine loosely adhered to the irregular borders of the ulcers, and to other parts of the valves.

Without commenting on any of the pathological features

of this case, I offer it as an illustration of the occasional co-existence of the signs and effects of phlebitis with rheumatic ulceration of the valves of the heart; and I would suggest that in this, as in the previous case, the vitiated state of the blood leading to the secondary deposits in various parts of the body, was the direct result of the introduction of morbid material from the inflamed and ulcerated valves of the heart, over which the blood would be continually flowing, and thus almost necessarily washing away the solid matter deposited on the diseased surfaces of the valves. It seems, indeed, quite obvious that the blood may be contaminated in this way almost as certainly as when fibrine, or pus, or any other organic or inorganic material in a state of fine division, is directly introduced into it by experiment or otherwise. The kind of constitutional effects produced may in some measure be determined by the nature of the foreign material mingled with the blood; yet the mechanical effects will probably in each case be nearly the same; for whether the foreign particles introduced be those of fibrine or of quicksilver, or anything else, if they are too large to traverse the first set of capillaries they reach, they will be arrested there, produce obstruction, and possibly lead to circumscribed inflammation and suppuration.

Materials introduced into the blood by experiment, absorption, or otherwise, commonly enter the venous blood, and with it are transferred to the lungs, where they exercise their primary and, perhaps, their only effects. But when the blood is contaminated by materials derived from the valves of the heart, it is arterial blood which is especially affected, and all the systemic organs and tissues are liable to suffer, because of the far greater frequency with which the left valves, compared with the right, are diseased. One wonders, indeed, why well-marked symptoms of contaminated blood do not more commonly accompany deposits on the left valves of the heart. It may be that such symptoms only arise when the morbid matter mingled with the blood is derived from the soft, semifluid, perhaps almost putrid, material resulting from the decay of old-standing masses of

fibrine, while recently deposited granules, washed away and mixed with the blood, may merely cause symptoms of irritation in the parts through which the blood circulates, or, at the same time, produce the fibrinous masses of so-called capillary phlebitis in various organs. It seems not improbable that many anomalous symptoms ensuing in the course of certain diseases, acute rheumatism for example, in which there exists a great tendency to the deposition of fibrine on the valves of the heart, may have their explanation in the irritation or other effects resulting from the existence of minute fragments of fibrine in the blood circulating through the organ whose functions are disordered. I would suggest that many functional disorders of the nervous system, especially chorea, may be thus explained. The frequent existence of a cardiac murmur in chorea, and the presence of warty vegetations on the valves of the heart so commonly found in fatal cases of this disease, are in favour of such a view.

## PART II.

### *On the effects which may result from the detachment of fibrinous deposits from the right valves of the heart.*

If, from what has been stated, it be assumed as probable that deposits of fibrine occurring on the valves of the left side of the heart may, by being detached, be productive of serious affections of remote organs, it may be inferred also that similar deposits occurring on the right valves may induce corresponding secondary affections of the lungs. And there seems to be sufficient evidence for believing that such is really the case. For it may, I think, be clearly shown, that most of the fibrinous or other similar secondary deposits in the lungs, also many of the old coagula found in the pulmonary artery or its branches, and possibly some forms of pulmonary apoplexy, are closely connected with, if not actually dependent upon, fibrinous deposits on the valves, or interior of the right side of the heart, or materials transmitted through the heart by venous blood. It is of course conceivable that

when the deposits on the right valves consist of large warty masses, as they occasionally do, portions of considerable size may be detached, and transmitted along the pulmonary artery, and so plug up one of the large branches of this vessel, just as similar masses detached from the left valves may be arrested in one of the main systemic arteries; but I have not yet met with a decided instance of such an occurrence. Probably the more usual manner in which the separation of fibrinous masses from the right valves leads to the formation of coagula in the pulmonary artery, is by the transmission of small particles to the minuter divisions of the artery, or to the capillary plexus, arrested at which they induce stagnation of the blood in those branches of the artery distributed to the seats of obstruction. Such a result is almost necessarily consequent on the peculiar mode of distribution of the branches of the pulmonary artery, which pass to their destination without anastomosis. In a paper on the formation of coagula in the pulmonary artery, published in the Transactions of this Society, Mr. Paget has clearly shown the influence which certain obstructions in the pulmonary capillaries, such as œdema, chronic pneumonia, and pulmonary apoplexy, sometimes exercise in inducing coagulation of blood in the arteries supplying the obstructed parts. And I have likewise noticed a similar influence apparently resulting from other circumstances, such as extensive old tubercular disease, and extreme compression of the lung by false membrane on the pleura, which have obliterated large portions of the pulmonary tissue. Mr. Paget also narrates instances in which particles of cancerous matter brought from remote organs to the right side of the heart, and thence transmitted to the lungs, became arrested in the pulmonary capillaries, and so induced stagnation and subsequent changes of the blood, in branches of the pulmonary artery. Cases like these, of which I have seen several examples, seem to leave no doubt that a like coagulation of blood in the pulmonary arteries may result from obstruction caused by the arrest of particles of fibrine detached from the right valves of the heart, and transmitted to the pulmonary capillaries. An instance of this is fur-

nished by one of the cases already narrated (Case III), in which, together with large, nodular, and warty masses attached to the tricuspid valve, nearly every branch of both divisions of the pulmonary artery were blocked up by old fibrinous coagula.

Another equally striking illustration is afforded by a specimen in the museum of St. Bartholomew's Hospital, in which, with extreme disease of the pulmonary valves, accompanied with the deposition of thick irregular layers of soft fibrine on each of them, there were old coagula filling many of the branches of the pulmonary artery. In this case there were also several large, solid, fibrinous masses in the substance of the lung; and it seems reasonable to believe that these, as well as the coagula in the pulmonary artery, had their origin in the deposits of fibrine on the pulmonary valves, portions of which were probably detached, arrested in the capillary plexus of the lungs, and so caused the fibrinous masses in the pulmonary tissue, and the consequent coagulation of blood in the arterial branches distributed to these parts.

The fibrinous masses in the lungs which the specimen just mentioned presents, appear not unlike portions of old pulmonary apoplexy, from which most of the colouring matter of the extravasated blood has been removed; and it is not improbable that many similar masses in other cases may have originated in a like cause, and not in hæmorrhage into the pulmonary tissue. Such masses, indeed, represent one form of the appearances described as capillary phlebitis of the lungs, or, in other words, one stage in the transformation undergone by blood stagnant and coagulated in the pulmonary capillaries. This blood passes through the same changes in the lungs that it undergoes when similarly situated in other organs; and the various examples of these changes are not unfrequently met with in the lungs. Thus, in Case III were found various gradations, from firm compact coagula, through soft, brownish, disorganised blood, to collections of yellowish, puriform material, which in places formed ordinary abscesses. Masses of such large size, and

with such obvious characters as these, are of course readily recognised. Yet not unfrequently deposits of a similar nature exist in the lungs, though of such extreme minuteness as to elude detection, unless specially sought for. These consist of small, slightly-elevated, red dots, with a pale-yellow or buff-coloured centre, scattered, sometimes thickly, over the surface and within the interior of the lung. They are exactly identical with that spotted form of capillary phlebitis already mentioned as often occurring in systemic organs and in various tissues, either combined with other forms or alone. When met with in the lungs I have hitherto invariably found it either as the result of some morbid material in the venous blood, or in direct connection with affection of the right valves of the heart ; such affection, namely, as is attended with the deposition of fibrinous granules on the surface of the valves. To quote but one instance out of several of the kind, I would mention the case of a girl under the care of Dr. Hue, early in the year 1851. This patient died suddenly, after suffering for some months with symptoms of extreme disease of the heart. Besides general enlargement of the heart, and narrowing of the mitral orifice, the free border of the tricuspid valve was studded with small, pale, fibrinous granules, a few of which existed also on the pulmonary valves. At first sight the lungs appeared healthy, but, on closer inspection, they were found freckled throughout with small, dark-red spots, like minute ecchymoses, in the interior of several of which was a distinct buff-coloured speck. The view which may not unreasonably be taken of these spots is, that they consisted of congested capillaries, in which minute fragments of fibrine, transmitted from the right valves of the heart had been arrested, the appearances, indeed, being just such as resulted from the injection of softened meat into the blood in one of M. Gaspard's experiments.

Under whatever form these various deposits are met with in the lungs, I believe that careful examination will show them to be almost invariably associated either with the presence of fibrinous growths on the right valves of the heart,

or with some other condition leading to the existence of particles of fibrine or other foreign matter in the blood transmitted to the lungs. Of these other conditions the most important seem to be the disintegration of old masses of fibrine situated within the right cavities of the heart, and a like disintegration of old coagula in some part of the venous system, and its subsequent mixture with the venous blood. It appears to be quite usual for the old colourless or pale-reddish clots found in the right cavities of the heart, especially in the appendix of the auricle, to soften in the centre, and be converted into a dirty reddish-brown or fawn-coloured material. Sometimes the softening extends through the whole substance of the mass, with the exception of a thin layer at the circumference, which forms a kind of cyst or bag within which the softened material is contained. Sometimes too this cyst bursts and discharges its contents, leaving nothing but the outer shell attached to the interior of the heart. The softened material thus let loose and mingled with the blood will doubtless contaminate it almost as effectually as the direct introduction of a similar material by injection into a vein would do. And it is easy to imagine that the solid particles of fibrine may be arrested at the capillaries of the lungs, and produce the various forms, especially perhaps the spotted variety of deposit to which allusion has been made. Old coagula in the veins too, under whatever circumstances they may have originated, appear almost equally liable to undergo softening, and to break up and mingle their disintegrated particles with the venous current along which they may pass to the lungs, and produce effects similar to those consequent on the transmission of like material from the cavities of the heart.

Such are some of the principal effects which the transference of fragments of fibrine from the right side of the heart appear capable of producing in the lungs. Much more might be said on the subject, but the length to which this communication has already extended precludes any further remarks at the present time. I would only add the suggestion that possibly the peculiar form of the pneumonia

sometimes observed in rheumatic fever may, in some way, have its explanation in the transmission of fibrinous particles from the right valves of the heart to the lungs. The almost invariable existence of disease of the pulmonary or tricuspid valves in the fatal cases of rheumatic pneumonia I have examined after death strongly favours the opinion that there is some close relation between this peculiar inflammation of the lungs and the fibrinous deposits on the right valves of the heart.

In conclusion, let me briefly recapitulate the principal points I have endeavoured to establish to the satisfaction of the Society. They are, 1st, the general fact that fibrinous concretions on the valves or the interior of the heart admit of being readily detached during life, and mingled with the circulating blood: 2dly, that if detached and transmitted in large masses, they may suddenly block up a large artery, and so cut off the supply of blood to an important part; if in smaller masses, they may be arrested in vessels of much less size, and give rise to various morbid appearances in internal organs; while, under other circumstances, the particles mingled with the blood may be extremely minute, possibly the debris of softened fibrine, yet in sufficient quantity and with sufficient power to produce a poisoned state of the circulating fluid, as manifested in the production of typhoid or phlebotic symptoms: 3dly, that the effects produced and the organs affected will be in great measure determined by the side of the heart from which the fibrinous masses have been detached; for, if the right valves have furnished the source of the fibrine, the lungs will bear the brunt of the secondary mischief, displaying it in coagula in the pulmonary arteries, and various forms of deposit in the pulmonary tissue: but if, as is far more commonly the case, the left valves are affected, the mischief is more widely spread, and may fall on any systemic part, but especially on those organs which, such as the brain, spleen, and kidneys, are largely and directly supplied with blood from the left side of the heart.

ON THE DIMINUTION  
OF THE  
CHLORIDES IN THE URINE,  
OR THEIR  
ABSENCE FROM THAT FLUID IN CASES OF PNEUMONIA ;  
AND ON THE  
CHEMICAL COMPOSITION OF THE SPUTA IN THAT DISEASE.

BY  
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IN August, 1850, Dr. Redtenbacher published some observations on the absence of chloride of sodium from the urine in cases of pneumonia.<sup>1</sup> This physician noticed that the quantity of chloride gradually diminished until the period of hepatization had occurred, when no traces whatever of the presence of the salt could be detected in the urine, but the chloride again made its appearance as the resolution of the inflammation progressed.

Since the publication of this interesting observation, so far as I am aware, no farther investigations on this subject, at least in this country, have been instituted, nor has any explanation of the fact been as yet offered.

A diminution in the quantity of chloride of sodium in the urine of various inflammatory diseases was remarked by Franz Simon ; and all observers agree that in inflammations generally, the urine contains a greater relative amount of

<sup>1</sup> Zeitschrift der k. k. Gesellschaft der Aertze zu Wien. August, 1850.

organic constituents than in health, while, on the other hand, the inorganic salts suffer a remarkable diminution.

This decrease in quantity of the inorganic salts is, doubtless, in part due to the altered diet taken by patients suffering from acute inflammatory diseases; but it will presently be shown that such an explanation alone will not suffice to account for the facts observed. In inflammatory attacks generally, although the chlorides may suffer diminution in quantity, or are altogether absent, this is not *constantly* the case, neither does the salt disappear at any particular period of the inflammation; but it has been shown by the observations of Dr. Redtenbacher on eighty cases of pneumonia, that in this disease the chlorides are invariably absent, and that the salt disappears from the urine at the precise period at which hepatization occurs in the lung.

Soon after the appearance of Dr. Redtenbacher's paper, I commenced a series of observations on the urine and other secretions in cases of pneumonia, with the view of making out, if possible, the channel through which the chloride of sodium was eliminated from the system in this disease, or the locality in which it was stored up during the persistence of the hepatization of the lung, and also with the hope of being able to trace the connection between the absence of the salt from the urine and the occurrence of hepatization.

My observations were made as opportunities occurred, on cases which were admitted into King's College Hospital; and for the advantage of prosecuting these inquiries, I am indebted to the kindness of the physicians of the hospital.

The cases were taken indiscriminately as they came into the hospital, and, consequently, both mild and severe cases have been the subject of observation. The detail of every examination of the urine, and all other circumstances connected with the subject that have fallen under my notice, have been reported, and the results which I have obtained may perhaps be found not unworthy of the attention of the Society.

In order to detect the presence of the chloride in the urine, Dr. Redtenbacher added a few drops of a solution of nitrate of silver to a portion of the urine acidulated

with nitric acid, and by the character of the precipitate so produced, he was enabled to judge roughly as to the excess or deficiency of the chlorides. Being anxious to obtain quantitative results in my analyses, I pursued a different method of investigation. My experiments were made simply with reference to the amount of fixed chloride, hence it became necessary to avoid the estimation of any volatile chlorine salt with the chloride of sodium, for it has been shown that a large quantity of hydrochlorate of ammonia often exists in urine; and if this salt were present in a specimen of urine which was tested as above described, with nitrate of silver and nitric acid, an abundant precipitate of chloride of silver would be thrown down, and the erroneous inference, that the urine contained an abundant quantity of chloride of sodium, might be drawn, although not a trace of it was present. Heller met with a case of pneumonia of the right lung occurring in a boy fourteen years of age, whose urine contained a large amount of hydrochlorate of ammonia, although only a mere trace of chloride of sodium could be detected.<sup>1</sup>

The following method was followed in the accompanying analyses. After ascertaining the reaction and specific gravity of the urine, 500 or 1000 grains were evaporated to dryness over a water bath, and when the dry residue ceased to lose weight by further drying, at a temperature of about 200° in a small hot water oven, its weight was noted, and being subtracted from the weight of the urine, the quantity of water in the portion of urine operated upon was obtained. A weighed portion of the solid residue was incinerated, and exposed to a dull red heat until thoroughly decarbonised, when its weight was taken, and from the result, the amount of salts present in the solid matter of 1000 grains of urine was easily calculated. The fixed salts were dissolved in a little distilled water, and acidulated by the addition of a few drops of nitric acid; a solution of nitrate of silver being then added, the presence or absence of fixed chloride was at once

<sup>1</sup> Simon's 'Animal Chemistry,' Sydenham Society's edition, translated by Day, vol. ii, p. 218.

determined. If a precipitate was produced, it was thrown upon a filter, washed, dried, ignited in a porcelain crucible, and weighed; the quantity in 1000 grains of urine was then calculated as before, and the proportion of chloride of sodium corresponding to the amount of chloride of silver ascertained. Thus, the quantities of solid matter, fixed salts, and chloride of sodium present in 1000 grains of urine were determined.

In all my analyses in which the amount of chloride was estimated, a similar process was followed; and in this way the quantity of chloride existing in the sputa, blood, and urine, at the same period of the disease, was ascertained in one of the cases recorded.

In all chemico-pathological investigations, it is a point of the utmost importance that the case forming the subject of the inquiry should be a well-marked instance of the particular morbid condition under consideration, for upon this fact alone can the value of the inferences drawn from the facts observed depend.

Frequently the diagnosis of a particular case has not with certainty been ascertained, or the patient may have been labouring under two or more morbid affections at the same time; and in consequence of this not having been discovered, or no record kept, all the labour of the chemist is unproductive of any useful result. At the same time care should be taken that the pathological observations of the chemist are not simply dependant upon the treatment pursued by the physician.

Although a recital of the cases of pneumonia, on which my observations were made, will necessarily prolong this paper to a length which the importance of the subject is scarcely sufficient to demand, I felt that, without a short history of the cases, and of the treatment followed in each, the statements brought forwards as facts, observed in certain cases of pneumonia, could not be relied on with that degree of confidence which can alone render original inquiry of interest to others. I have, therefore, appended a short history of each case, with a general outline of the treatment pursued. In most instances the abstract was prepared

from the notes kept by the clinical clerks of the physician, under whose care the patient was placed.

In order that the results obtained in each analysis might be compared with each other, I have calculated, from the figures representing the quantity of each constituent existing in 1000 grains of the fluid, the quantity which would be present in 100 grains of solid matter,—by which mode of representing the results of analysis much ambiguity is prevented, and the apparent dissimilarity in composition of fluids, taken at different periods of time and from different cases, arising merely from a varying quantity of water, is avoided. For the conflicting results obtained by chemists in reference to the composition of particular animal fluids may often be referred to the presence of a different quantity of water, while the relation of each constituent to the others remains the same, as shown by a simple calculation; or, on the other hand, striking variations in the relative proportions may exist, and may entirely escape notice, if this reduction be neglected.

Before entering into the details which I have collected with reference to the subject, I will premise the following remarks. A deficiency of chloride of sodium, or its total absence from the urine, is not by any means peculiar to cases of pneumonia, nor even to acute inflammatory disease generally. An absence of the salt has been noticed in various conditions by several observers; and more than one case in which its absence could not be traced to any such cause has fallen under my own notice. It will probably be found that the presence of this salt in the urine merely depends upon a quantity of it being taken with the food greater than is required for the wants of the system, (in which case chloride of sodium would hardly be enumerated as one of the necessary constituents of healthy urine;) but in the present state of knowledge we are hardly justified in drawing such an inference; hence, throughout this paper, I have considered that healthy urine contains a certain quantity of this salt, (about 3·5 per 1000 parts, or five per cent. in the solid matter,) although, in different analyses of the

normal secretion, we find the quantity of the salt subject to great variations.

The absence of chloride of sodium from the urine, I believe, indicates that there is a deficiency, or at least that there is no excess, of the salt in the blood; and therefore, taken alone, it must be regarded as an interesting fact in the pathology of pneumonia, for it appears to be constantly absent in this disease, although it is also occasionally absent from the urine of other affections; but, when its absence from the urine in pneumonia is considered in conjunction with the existence of a considerable excess of the salt in other secretions, or in the inflammatory products, it may be looked upon as one link of a chain of phenomena which, when more fully investigated, appears likely to shed a new light upon the hidden processes of pathological metamorphoses.

CASE 1.<sup>1</sup>—Samuel Trevitt, æt. 24, a plasterer by trade. Eight years ago he contracted syphilis, and has never been in good health since this period. He had suffered from sore throat; and about six months before his admission into the hospital, an abscess formed on the left side of the forehead, and soon broke, leaving a sore which has not since healed. Three months since a portion of the frontal bone, about the size of a fourpenny piece, became exposed at the bottom of the wound, and still continues bare; it was quite black, and did not manifest the slightest tendency to separate.

The patient had been troubled with slight cough for a fortnight before the symptoms of pneumonia manifested themselves.

*First day of the disease.*—On January the 4th the man was seized with three or four sharp rigors, followed by pain in the chest and loss of appetite. At the same time his cough much increased in severity. He was admitted into the hospital on January the 6th, under the care of Dr. Budd.

*Third day of the disease:* January 6th.—The patient complained of having been attacked with severe rigors,

<sup>1</sup> From the notes of Mr. Hear.

coming on three or four times a day since the 4th. He also suffered from pain in the loins, and great difficulty of breathing. There was fixed pain in the front of the sternum, and a sharp catching pain came on frequently in the left side of the chest. The patient said that he felt excessively weak. The tongue was covered with a thick white fur, the skin was hot and dry, and the lips were parched. The right side of the chest, more particularly at the lower part, was observed to expand more than the left during the movements of respiration. In front, dulness on percussion was present from two inches below the left mamma to the base of the lung; and behind, it existed over the space below the spine of the left scapula. Bronchial breathing and bronchophony were audible over the lower angle of the scapula. Expectoration viscid, frothy, and slightly rusty. Pulse 144, small and weak; respiration, 52.

The patient was put upon milk diet and beef tea. Turpentine stupes were applied to the chest, and he was ordered to take half a drachm of antimonial wine every four hours.

*Fourth day of the disease:* January 7th.—Bronchial breathing and bronchophony more distinct, and heard over the infra-spinal region. The dulness confined to the situation of the lower lobe of the left lung. Pain in the side better. Purged six times since last night. Has vomited in the night, but by this time the nausea had left him.

The same quantity of antimonial wine was ordered to be taken every six hours, and the turpentine stupes to be repeated twice in the day. Pulse 116; respiration 28.

The urine was high coloured, of acid reaction, and of specific gravity 1017. It contained a little albumen.

				100 parts of the solid matter.	
Water	.	.	.	956.60	—
Solid matter	.	.	.	43.40	—
Organic matter	.	.	.	40.28	92.82
Fixed salts	.	.	.	3.12	7.18
Chloride of sodium	.	.	.	0	—

*Fifth day of the disease:* January 8th.—The patient had been purged three times since the last report. The tongue

was cleaner, and he did not suffer from any pain. Bronchial breathing could only be heard upon a deep inspiration. Returning crepitation was audible in the lower part of the left lung. Expectoration still rusty. Pulse 88; respiration 28.

Fifteen minims of antimonial wine were ordered to be taken every six hours.

The urine was of the natural colour, of a slightly acid reaction, and specific gravity 1013; it still contained albumen.

Water	.	.	.	.	.	957.40
Solid matter	.	.	.	.	.	42.60
Chloride of sodium	.	.	.	.	.	traces.

*Sixth day of the disease:* January 9th.—Crepitation increased. Bronchial breathing still audible upon deep inspiration, about the spine of the scapula. Pulse 80; respiration 28.

The urine was pale in colour, of acid reaction, and its specific gravity was 1016; albumen was still present.

						100 parts of the solid matter.
Water	.	.	.	.	954.00	—
Solid matter	.	.	.	.	46.00	—
Organic matter	.	.	.	.	44.64	97.05
Fixed salts	.	.	.	.	1.36	2.95
Chloride of sodium	.	.	.	.	0	—

*Eighth day of the disease:* January 11th.—Tongue clean. Crepitation much increased. Bronchial breathing audible. Dulness still remains. Passed about three pints of urine in the twenty-four hours. Pulse 84; respiration 24.

*Tenth day of the disease:* January 13th.—The urine was acid; of specific gravity 1022. The presence of albumen was no longer detected.

						100 parts of the solid matter.
Water	.	.	.	.	955.00	—
Solid matter	.	.	.	.	45.00	—
Organic matter	.	.	.	.	42.12	93.6
Fixed salts	.	.	.	.	2.88	6.4
Chloride of sodium	.	.	.	.	0	—

On January 15th the antimony was discontinued, and an

ounce of the solution of citrate of ammonia, which was ordered to be taken three times a day, was substituted for it.

On January 25th it was noted that the expectoration had almost entirely ceased. The tongue was clean. Dulness, however, was still present over the lower lobe of the left lung, and bronchial breathing was just audible over the infra spinal fossa, when the patient took a deep breath. Pulse 64.

The urine was pale, acid, and of specific gravity 1016; it did not contain albumen.

		100 parts of the solid matter.	
Water . . . . .	968.40	—	—
Solid matter . . . . .	31.60	—	—
Organic matter . . . . .	23.26	73.61	
Fixed salts . . . . .	8.34	26.39	
Chloride of sodium . . . . .	4.56	14.43	

From this period the patient gradually improved, and he was discharged well on February the 8th. The syphilitic sore on the forehead had not altered in appearance since his admission.

In comparing the analysis of the urine in the present case, it may be remarked that on the fourth day of the disease, when the symptoms of the affection were well developed, there was a considerable decrease in the amount of fixed salts as compared with healthy urine, and that the saline constituents generally had suffered a great diminution relatively to the solid matter of the urine. On the fifth day of the disease traces of chloride of sodium were detected; this, however, may have been merely accidental.

On the sixth day of the disease a further diminution in the quantity of saline matter was observed, although the case was progressing very favorably and the signs of resolution were well marked. The decrease may perhaps be explained by the purging, from which the patient suffered on the previous day. On the tenth day the amount of salts had again increased, but still no chloride of sodium could be detected.

On the twenty-second day from the commencement of the symptoms, the urine was again examined, and the

relative proportion of salts was found to have slightly exceeded the healthy standard. At the same time there existed an amount of chloride of sodium somewhat greater than that found in healthy urine; but in a state of health the quantity of this salt is subject to great variations. In the present instance there were found 14.43 to 100 of solid matter, the amount in health being about 5.4, although in an analysis of healthy urine by Franz Simon, there existed as much as 14.13, corresponding to 100 of solid matter.

From the examination of the urine in this case, the following facts were observed:

1. A considerable relative diminution of the quantity of the salts generally, until the patient progressed towards convalescence, when the amount again increased, until, on the twenty-second day, the quantity was found to exceed that present in health.

2. A total absence of chloride of sodium from the urine, (with the exception of one day, on which traces were found,) until convalescence was established.

3. The presence of albumen in the urine from the fourth day of the disease to the sixth inclusive, (during which period the pneumonia was at its height.) On the tenth day albumen could not be detected in the urine.

CASE II.—Edward Mills, æt. 28, a man of middle stature, having a fair complexion and red hair, was admitted into the hospital on February the 5th, 1851, under the care of Dr. Todd. The patient was a railway porter, and had usually been in the enjoyment of excellent health. On February the 3d he was attacked with shivering, shortness of breath, accompanied with cough, and a sharp cutting pain in the left side. In a short time these symptoms were succeeded by excessive thirst, loss of appetite, and the expectoration of viscid rusty-coloured mucus.

*Third day of the disease.*—On February the 5th the following physical signs were observed: dulness on percussion existed over the lower half of the left side of the chest behind, extending quite to the base of the lung, and reaching

From the notes of Mr J. H. Sylvester.

laterally to a line drawn downwards from a short distance below the axilla. Bronchial breathing and bronchophony were heard over this part of the chest, and the voice was rather ægophonic in character. In other situations the breathing was healthy. The sputa were abundant, very viscid, and highly rusty. Urine scanty and high-coloured. Pulse 96. Respiration 36.

He was ordered to take an ounce of the liquor ammoniæ citratis every four hours, and turpentine stupes were applied to the left side of the chest. He was put upon milk diet with beef-tea.

*Fourth day of the disease.*—On February the 6th the urine had an acid reaction, and contained a deposit of lithate of ammonia with many rhomboidal crystals of lithic acid. A specimen of this urine contained,—

		100 parts of the solid matter
Water . . . . .	936.50	—
Solid matter . . . . .	63.50	—
Organic matter . . . . .	56.86	89.55
Fixed salts . . . . .	6.64	10.45
Chloride of sodium . . . . .	traces.	

The ash was dissolved in water, acidulated with nitric acid. The addition to this solution of a few drops of a solution of nitrate of silver produced a slight turbidity.

*Fifth day of the disease.*—On the 7th there was no great alteration in the character of the symptoms, except in the commencement of large crepitation at the base of the left lung. The pulse was 90, and the respiration 36. An herpetic eruption had appeared on the lips. He was ordered to take the citrate of ammonia every three hours, and to continue the stupes night and morning.

He still complained of pain in the left side. The deposit which subsided from the urine consisted chiefly of lithate of ammonia, with a few transparent casts, and a few lithic acid crystals. Its reaction was acid, and its specific gravity 1025.

The ash, obtained by incinerating and decarbonising a portion of the solid residue of evaporation, contained only a trace of chloride.

*Sixth day of the disease.*—On the 8th, in consequence of the continuance of severe pain in the side, Dr. Todd ordered the application of ten leeches, which was followed by immediate relief. The sputa were less viscid, but still rusty. Pulse 80. Respiration 40.

The urine exhibited an acid reaction, and had a specific gravity of 1025. The deposit consisted of lithate of ammonia, with a little lithic acid. The ash was tested as before for chloride, but not a trace could be detected.

On the 9th the respirations had fallen to 30, and bronchial breathing was entirely replaced by crepitation.

*Eighth day of the disease.*—On February the 10th (the fifth day after admission) the following was the condition of the patient:—His skin was moist. The rusty character of the sputa had entirely disappeared. Upon listening carefully to his chest a little fine crepitation was still heard over one spot upon a deep inspiration, and there was slight resonance of voice below the angle of the scapula. The cough was less frequent, and the tongue was clean.

From this period the patient gradually progressed, and left the hospital quite well on February the 20th, having been fifteen days under treatment.

The urine continued to deposit lithate of ammonia and lithic acid during the whole period of the disease. On the 13th it was found to be acid, and its specific gravity was 1030. It contained an abundant deposit of lithate of ammonia, and its surface was covered with an iridescent pellicle. The urine was not farther examined.

In this case small quantities of chloride of sodium were detected in the urine up to the fifth day of the disease, when resolution of the inflammation had commenced: on the following day, however, not a trace of the salt could be discovered. Lithate of ammonia was present in the urine throughout the disease, and the specific gravity was high (varying from 1025 to 1030). The relative amount of fixed salts was found to be considerably diminished in the analysis of the urine on the fourth day of the disease; but the decrease had not proceeded to the same extent as in some of

the other cases, which might have been anticipated, in consequence of the patient progressing so rapidly towards convalescence.

CASE III.<sup>1</sup>—Timothy Warren, æt. 34, married, a strong, healthy-looking, and powerful man, of swarthy complexion and dark hair, was admitted into the hospital on February the 24th, 1851, under Dr. Todd. He was a labourer, somewhat above the middle stature, of temperate habits, and usually in the enjoyment of good health.

On the 19th he was seized with severe headache, loss of appetite, thirst, and shortness of breath, accompanied by cough, and a sharp shooting pain, aggravated by inspiration, and situated immediately beneath the right mamma.

*Fifth day of the disease.*—On the 24th the following symptoms were noted: face somewhat flushed, and the expression anxious; skin hot and dry. The patient was unable to lie on the right side. He coughed very much, and expectorated rusty mucus. There was severe lancinating pain in the right side. On the lips were the marks of recently healed herpetic eruption. The tongue was dry and brown. On the right side of the chest behind, there was dulness on percussion, over the situation of the lower lobe of the right lung. Bronchial breathing was distinctly heard, and was louder on expiration than during inspiration. Bronchial breathing was also audible over the inner part of the spine of the scapula. Breathing pure in other parts of the chest.

He was ordered milk diet with beef-tea, and to take an ounce of liquor ammoniæ citratis every four hours. Turpentine stupes were applied to the affected side of the chest. The urine had an acid reaction and a specific gravity of 1017. One thousand parts contained,—

		100 parts of the solid matter.
Water . . . . .	950·56	—
Solid matter . . . . .	49·56	—
Organic matter . . . . .	46·20	93·23
Fixed salts . . . . .	3·36	6·77

<sup>1</sup> From the notes of Mr. E. Siddon.

In the fixed salts not a trace of chloride of sodium could be detected. The addition of a solution of nitrate of silver to an aqueous solution of the salts acidulated with nitric acid did not even cause the slightest turbidity of the solution. The salts contained much alkaline phosphate.

*Sixth day of the disease.*—On the 25th the symptoms continued much the same. The expectoration was viscid and rusty. Pulse 110; respiration 44. The patient was ordered to take the saline mixture every two hours, and ten minims of tincture of hyoscyamus were added to each dose.

*Seventh day of the disease.*—On the 26th bronchial breathing and brochophony were very distinctly heard at the base of the right lung, and were audible over a greater extent of surface than before. The bronchial breathing heard over the spine of the scapula was less distinct, and was accompanied with vesicular breathing. The expectoration was less viscid, and more deeply tinged with blood. Pulse 100; respiration 44.

The urine was of an acid reaction, and its specific gravity was 1015.

				100 parts of the solid matter.
Water	.	.	.	955.80 —
Solid matter	.	.	.	44.20 —
Organic matter	.	.	.	43.19 . 97.72
Fixed salts	.	.	.	1.01 . 2.28
Sulphate of potash	.	.	.	.50 —
Chloride of sodium	.	.	.	0 —

*Eighth day of the disease.*—On the 27th crepitation was heard in the right mammary region, and was commencing at the base of the lung posteriorly; but in this situation bronchial breathing was still audible, and a dull sound was elicited upon percussion. The pain was quite relieved. Tongue white and coated. Sputa diminished in quantity, but still rusty and viscid. Pulse 96; respiration 31.

Urine acid, high-coloured; specific gravity 1020. Contains no albumen. The urine was not farther examined.

He was now ordered to take a pill composed of a grain of calomel and a grain of ipecacuanha every six hours; but one

pill only was administered. The mixture to be continued as before. A blister was applied to the right side.

*Ninth day of the disease.*—On the 28th vesicular breathing was heard behind in the lower part of the right side, and was accompanied with very slight crepitation, which, however, became more distinct when the patient took a deep inspiration. Pulse 84; respiration 30.

The sputa were no longer rusty, were less viscid, and were neutral to test paper. 1000 parts were found to contain,—

		100 parts of the solid matter.
Water . . . . .	941.53	—
Solid matter . . . . .	58.47	—
Fixed salts . . . . .	14.49	24.78
Chloride of sodium . . . . .	5.92	10.12

*Tenth day of the disease.*—On the 1st of March the patient was reported as convalescent. Slight dulness on percussion, however, still remained in the lower part of the right side behind, and the breathing was accompanied with crepitation. Sputa quite clear and much less in quantity. Cough slight. Pulse 80; respiration 24.

The urine was again subjected to analysis, and yielded the following results: it was of acid reaction, and its specific gravity was 1020.

		100 parts of the solid matter.
Water . . . . .	946.90	—
Solid matter . . . . .	53.10	—
Organic matter . . . . .	49.33	92.91
Fixed salts . . . . .	3.77	7.09
Chloride of sodium . . . . .	not a trace.	

*Eleventh day of the disease.*—On March 3 the pulse was 64, and the respiration 22. Percussion everywhere resonant. The patient was discharged cured.

In the analyses of the urine of this case the diminution in quantity of the inorganic constituents is well marked, and is very much below the amount found in a state of health. Upon referring to the figures representing the proportion of saline residuc contained in 100 parts of solid matter, we find in the first analysis 6.77, in the second 2.28, and in the third 7.09, while in the healthy urine 25.00 would represent the quantity of fixed salts corresponding to 100 of solid

matter. It is interesting to observe that on the fifth day of the disease, before the hepatization had developed itself to the full extent, the quantity of fixed salts in the urine was triple that found on the seventh day, about which time the disease was at its height. On the tenth day, after the symptoms of hepatization were no longer present, and the pulse having fallen to 80 and the respiration to 24, and bronchial breathing having been replaced by crepitation, we find a great increase taking place in the quantity of fixed salts, although the chloride of sodium had not yet reappeared in the urine.

The analysis of the sputa on the ninth day of the disease exhibits results of great interest, the saline residue being, in proportion to the organic constituents, unusually abundant.

From an analysis of healthy pulmonary mucus, performed many years ago by Hasse, the quantity of salts corresponding to 100 parts of solid matter amounted to rather more than 18, while in the present instance we find very nearly 25 parts, the exact quantity contained in healthy urine. At the same time it will be observed that the sputa were very rich in the amount of chloride of sodium which they contained, although not a trace of this salt could be detected in the specimens of urine subjected to examination.

In this case of pneumonia the following facts were observed:

1. A diminution of the fixed saline matters, generally, in the urine, and an increase of the organic constituents.

2. A total absence of chloride of sodium in the urine from the fifth day of the disease to the tenth day, when the patient was convalescent, and symptoms of hepatization were no longer to be detected.

3. A remarkable increase, compared with the quantity present in a state of health, in the amount of fixed saline matter in the sputa of the ninth day, (the rusty character having disappeared on the previous day,) and the presence of a considerable proportion of chloride of sodium.

CASE IV.<sup>1</sup>—James Minns, æt. 17; thin and tall, of fair complexion, with light hair and grey eyes. The patient is

<sup>1</sup> From the notes of Mr. J. H. Sylvester.

a waiter in a coffee house, and was admitted into the hospital on February the 11th, 1851, under the care of Dr. Todd. His illness commenced on February the 8th, with loss of appetite, shivering, cough, a sensation of oppression at the chest, accompanied by frequent vomiting, and a sharp cutting pain in the right side. On the 11th, the usual symptoms of pneumonia had manifested themselves; the patient suffered from troublesome cough, accompanied with viscid, rusty sputa, and in the lower part of the right side of the chest, posteriorly, crepitation and bronchial breathing were audible. Percussion was dull over the situation of the lower lobe of the right lung behind. The respiration was 34, and the pulse 128. It should be mentioned that there was complete absence of vocal vibration in the region, which was found to elicit a dull sound upon percussion. On the 12th, however, vocal vibration returned. The sputa became quite clear on the 14th. The pulse had fallen to 84, and the respiration to 32. On the 17th, vesicular breathing was re-established, and on the 19th the patient was convalescent. He was discharged on the 21st. The treatment pursued in this case consisted of the frequent application of turpentine stupes to the affected part of the chest, and an ounce of the liquor ammoniæ citratis was administered every four hours.

On the 11th the urine had a specific gravity of 1020, and upon testing an acidulated solution of the ash with nitrate of silver, a precipitate of chloride was produced.

On the 13th the reaction of the urine was acid, and its specific gravity was 1025. It contained an abundant deposit of lithate of ammonia.

				100 parts of the solid matter.
Water	.	.	.	945.80
Solid matter	.	.	.	74.20
Organic matter	.	.	.	69.36
Fixed salts	.	.	.	4.84
Chloride of sodium	.	.	.	0
				—
				100.00
				93.48
				6.52
				—

The ash contained alkaline phosphates and sulphates, but not a trace of chloride could be detected upon testing the aqueous solution acidulated with nitric acid, with a solution of nitrate of silver.

In this case, chloride of sodium was detected in the urine passed on the 11th, at which period the disease may be said to have attained its height, but from this time the quantity, no doubt, rapidly diminished until the 13th, when the presence of chloride was no longer detected. An increase in the amount of the organic constituents of the urine, and a corresponding diminution of the amount of fixed salts, is also observed in the analysis of the urine of the 13th.<sup>1</sup>

CASE V.<sup>2</sup>—The patient was a young man of the name of Carter, æt. 22, a gentleman's servant, and was admitted into the hospital under the care of Dr. Todd, on March 20, 1851. At the time of his admission he was in a very low and depressed state, and he was occasionally slightly delirious. This condition followed an attack of rheumatic fever, which had occurred about six weeks previously, and since this attack he had never regained his previous good health. He had been suffering from want of sleep and loss of appetite, with occasional vomiting. He also complained of seeing spectra about the bed, and his hands trembled very much when he attempted to move them. No evidence whatever could be gained from himself or from his friends of his being of other than temperate habits. His pulse was about 100. He was put upon twenty minims of laudanum every four hours, and in the course of a few days a grain of quinine was ordered to be taken with each dose of the medicine. A few days after his admission other symptoms manifested themselves, among the most important of which, were obstinate constipation, with headache, and dimness of sight. The tongue was moist and coated, and the face flushed. The man was easily startled by the slightest noise, and he was more delirious at night than during the day; and soon the delirium became low and muttering in character.

On March the 26th (six days after admission), symptoms of pneumonia manifested themselves, his pulse had risen

<sup>1</sup> This, and Case II, were made the subjects of a Clinical Lecture by Dr. Todd, which was delivered in May, 1851, and has since been published in the 'Medical Times' of May the 15th, 1852.

<sup>2</sup> From the notes of Mr. E. Siddou.

from 100 to 136, and the respiration to 40. In his other symptoms, no change had taken place. The breathing was laboured and diaphragmatic. Dulness existed over the lower part of the left side, behind, and in this situation bronchial breathing and bronchophony were distinctly audible, but no crepitation whatever could be detected. Over other parts of the chest rhonchus was present. There was no expectoration. It should be observed that on the previous day there was no evidence whatever of the existence of pneumonia.

The urine of March the 26th had an acid reaction, and was of specific gravity 1026.

		100 parts of the solid matter.
Water . . . . .	936.70	—
Solid matter . . . . .	63.30	—
Organic matter . . . . .	54.32	85.82
Fixed salts . . . . .	8.98	14.18
Chloride of sodium . . . . .	traces.	

The patient was put upon ounce doses of the liquor ammoniæ citratis every two hours, and six ounces of brandy were given during the twenty-four hours. A blister was applied to the left side, and turpentine stupes to other parts of the chest. A castor oil enema was also ordered to be administered.

*Second day of the Pneumonia.*—On March the 27th the patient appeared to be lower. The muttering delirium continued, and the physical signs had undergone no change. The bowels had not been relieved. Pulse 120; respiration 40.

The urine was acid, and of specific gravity 1021.

		100 parts of the solid matter.
Water . . . . .	955.40	—
Solid matter . . . . .	44.60	—
Organic matter . . . . .	36.43	81.69
Fixed salts . . . . .	8.17	18.31
Chloride of sodium . . . . .	0	—

The serum obtained from the blister was also examined :  
1000 grs. contained—

		100 parts of the solid matter.
Water . . . . .	924.49	—
Solid matter . . . . .	75.51	—
Fixed salts . . . . .	7.84	10.35

The fixed salts contained much chloride, but the quantity was not estimated.

The brandy was now increased to twelve ounces in the twenty-four hours, and half a drachm of chloric ether was added to each dose of the mixture. The application of turpentine stupes was continued.

*Third day of the Pneumonia.*—On March the 28th the pulse had risen to 160, and was very weak and fluttering, and the respiration had increased to 44. The patient was evidently sinking fast. The delirium continued to exhibit the same characters up to the time of his death, which occurred in the evening. His bowels had not been relieved.

The post-mortem examination was performed about thirty-six hours after death. The surface of the brain was much congested, and a considerable quantity of yellowish fluid was found effused in the sub-arachnoid spaces at the base of the brain. In these situations the serous membrane had become quite opaque and very strong, not being easily torn asunder.

The lower lobe of the left lung was found to be much gorged with blood, but it did not sink in water; when a portion was pressed, crepitation occurred, and much dark red blood was squeezed out.

The urine in this case exhibited the chief points which were observed in other instances, although the amount of salts generally was considerably greater than in many of the other cases reported. It is to be regretted that the salts were not further examined, and the amount of the alkaline phosphate ascertained; for, according to the observations of Dr. Bence Jones, a considerable excess of this salt might have been expected in the urine of this case. Notwithstanding the proportion of salts being large, not a trace of fixed chloride could be detected in the urine on the day after the pneumonia had been discovered, although a considerable quantity was found to be present in the serum.

CASE VI.<sup>1</sup>—Daniel Henessy, æt. 17, was admitted into the hospital, under the care of Dr. Todd, on April the 11th,

<sup>1</sup> From the notes of Mr. E. Siddon.

1851. He said that his mother's family were consumptive, and that he himself had never enjoyed very robust health. For some months previous to his present attack he had suffered from cough, accompanied with profuse expectoration; and about three years previously had been in the hospital, under the care of Dr. Todd, for an attack of pneumonia, from which, however, he perfectly recovered.

On April the 3d he was attacked with rigors and severe pain in the left side, which was much increased upon taking a deep inspiration. At the same time the expectoration, which had been profuse, became scanty, of a rusty colour, and tenacious consistence.

*Eighth day of the disease.*—The symptoms continued much the same up to the time of his admission, when the pulse was found to be 120, and the respiration 36. He complained of feeling very weak, and the pain in the side was severe. Percussion was dull over the situation of the lower lobe of the left lung, and bronchial breathing was audible. Expectoration scanty, and rather rusty in colour. He was put upon ounce doses of the liquor ammoniæ citratis every two hours. Turpentine stupes were applied to the left side of the chest, and afterwards a blister.

*Ninth day of the disease.*—On April the 12th bronchial breathing was no longer audible, but the dulness still remained. Much crepitation was heard on the left side of the chest. Expectoration fluid and abundant, but not at all rusty. Pulse 108; respiration 32.

The man had passed about two pints of urine in the twenty-four hours, which was high coloured, of acid reaction, and specific gravity 1022.

				100 parts of the solid matter.	
Water	.	.	.	944.13	—
Solid matter	.	.	.	55.90	—
Organic matter	.	.	.	48.34	88.27
Fixed salts	.	.	.	6.56	11.73
Chloride of sodium	.	.	.	0	—
Sulphuric acid	.	.	.	.72	1.28
Phosphoric acid	.	.	.	2.15	3.84

*Tenth day of the disease.*—On April the 13th the report

stated that the dulness did not extend over so large a space as before, and that the breathing was still accompanied with a little crepitus.

The urine was acid, of specific gravity 1022.

		100 parts of the solid matter.
Water . . . . .	938.70	—
Solid matter . . . . .	61.30	—
Organic matter . . . . .	57.80	94.30
Fixed salts . . . . .	3.50	5.70
Chloride of sodium . . . . .	0	—

*Eleventh day of the disease.*—The patient was now convalescent. He was put upon middle diet; and on the 15th he was ordered to omit all other medicine, and to take two grains of quinine three times a day.

His urine was again examined on the 15th. It was of acid reaction, of specific gravity 1026, and contained an abundant deposit of lithate of ammonia.

		100 parts of the solid matter.
Water . . . . .	926.10	—
Solid matter . . . . .	73.90	—
Organic matter . . . . .	65.77	89.00
Fixed salts . . . . .	8.13	11.00
Chloride of sodium . . . . .	0	—

The salts consisted chiefly of alkaline sulphates and phosphates; but not a trace of chloride could be detected in the ash.

In consequence of the patient not recovering his strength so rapidly as could be wished, and also on account of the cough continuing, he was kept in the hospital until May the 14th, when he was discharged well.

In the analyses of the urine of the present case, the diminution of the quantity of salts generally and the increase of organic matter are well marked. The absence of chloride of sodium from the urine, even when convalescence was established, probably depended upon the persistence of the expectoration.

CASE VII.<sup>1</sup>—James Regan, æt. 32, a compositor, of in-

<sup>1</sup> From the notes of Mr. Maurice Davis.

temperate habits, who nevertheless had enjoyed good health, was admitted into the hospital on May the 12th, 1851, under the care of Dr. Todd.

The patient had been suffering from cough, accompanied with the expectoration of dirty-looking mucus, for some five or six months previous to his present attack. About a week before his admission he was exposed to cold, by standing for an hour in the street. Eight hours afterwards, pain came on in his left side, and had much increased in severity by the evening. At the same time the cough became more violent, and had gradually increased in frequency up to the time of his admission. The pain in the side had not been relieved.

*About the seventh day of the disease.*—On May the 12th the following physical signs were noted. Dulness on percussion existed below the left nipple, and in this situation bronchial breathing with some fine crepitation were audible. Posteriorly, below the spine of the scapula, there was also some fine crepitation over the lower part of the left lateral region. On the right side of the chest some rhonchus was heard. The sputa were not rusty, and according to the patient's statement, had not been so; they were, however, very viscid, and firmly adhered to the sides of the vessel that contained them. Pulse 108, respiration 30.

The patient was ordered to take an ounce of the liquor ammoniæ citratis every four hours, turpentine stupes were applied to the chest, and he was put upon milk diet with beef tea.

*About the eighth day of the disease.*—On the following day, the report was, that the cough was less troublesome, and no bronchial breathing could be detected. Pulse 70, respiration 30.

The urine passed on May the 13th was found to be acid, of specific gravity 1018, and upon analysis, gave the following results:

		100 parts of the solid matter.
Water . . . . .	955.60	—
Solid matter . . . . .	44.40	—
Organic matter . . . . .	40.31	93.05
Fixed salts . . . . .	3.09	6.95
Chloride of sodium	traces.	

The salts consisted chiefly of sulphates and phosphates. The sputa were now thin and frothy, and did not exhibit the slightest rusty tinge. 395.5 grs. were submitted to analysis, and the results calculated to 1000 parts.

		100 parts of the solid matter.	
Water	979.52	—	
Solid matter	20.48	—	
Fixed salts	6.73	32.86	
Chloride of sodium	3.71	18.11	

On the 14th diarrhœa came on, for which he was ordered to take chalk mixture with a little laudanum. Fine crepitation was still audible below the spine of the left scapula, and also below the nipple of the same side. Pulse 60; respiration 18.

The urine was acid; of specific gravity 1020; and contained a deposit of lithates.

On the following day, the crepitation had become, to a certain extent, replaced by rhonchus.

On the 16th, a blister was applied to the back of the left side of the chest, and the serum obtained from it was submitted to analysis:

		100 parts of the solid matter.	
Water	927.8	—	
Solid matter	72.20	—	
Fixed salts	8.36	11.57	
Chloride of sodium	6.45	8.93	

The urine passed on the same day was also analysed, and yielded the following results: it was of acid reaction, and of specific gravity 1020.

		100 parts of the solid matter.	
Water	951.20	—	
Solid matter	48.80	—	
Organic matter	38.59	79.08	
Fixed salts	10.21	20.92	
Chloride of sodium	3.18	6.51	

On May the 18th the patient was put upon quinine, and from this time he gained strength daily, and was discharged on the 26th, having been fourteen days in the hospital.

A specimen of urine from the present case, was not

obtained prior to the commencement of resolution of the inflammation. The urine passed on the 13th contained traces of the presence of fixed chloride; but the salts generally scarcely exceeded one fourth of the amount present in healthy urine.

The last analysis of the urine (May the 16th) contained nearly as much saline matter as is found in health, while the chloride of sodium actually exceeded the normal proportion in a slight degree, a fact which receives some explanation from an analysis of the serum obtained from a blister applied on the same day. In that analysis it will be noticed that the chloride of sodium amounts to 6.45 per 1000, or 8.93 in 100 of solid matter. In health about 4.5 grs. are usually found in 1000 of serum, and about 5.0 grs. in 100 of solid matter.

This great excess of chloride of sodium in the serum of this patient a few days after resolution had commenced, probably depended upon the absorption of a large quantity of the salt which had been previously effused into the air cells at the time when hepatization took place; and this appears still more probable when the fact of the presence of so large a quantity in the urine is considered: for, in the analysis of the urine passed on May the 13th, it was shown that only traces of chloride were present; and in the analysis of the sputa expectorated on the same day, the existence of an abundant amount of chloride was proved. Hence, it would appear that on May the 13th there existed a decided determination of chloride to the lung, and that the force of attraction for this salt was such, as to reduce the quantity of it in the blood so much, that only traces were excreted in the urine. On the other hand, only three days later the attraction of the salt to the inflamed pulmonic tissue had not only ceased, but had given place to a force acting in the contrary direction; and now the chloride of sodium, which in the earlier part of the disease, had been caused to exosmose from the capillary vessels of the lung, by reason of an active cell-forming process proceeding in the inflammatory exudation external to them, becomes reabsorbed by those same vessels, in consequence of the cessation of the cell formation, and the necessary removal of the effused inflammatory products;

and in this way the excess of chloride present in the serum is to be accounted for.

CASE VIII.<sup>1</sup>—Samuel Sessions, æt. 39, a plasterer; admitted into the hospital under the care of Dr. Todd, on May the 28th, 1851. The patient was a tall, powerful man in an excellent state of nutrition. His general health had always been good; but for many years past he had been troubled with ulcers of both legs, which obliged him to rest for a few days occasionally. On the morning of the 23d he was attacked with a sharp rigor, and a second occurred during the day. Soon afterwards pain came on in the right side, and was accompanied with difficulty of breathing and cough.

*Fifth day of the disease.*—On May the 28th there was dulness over the central part of the right side of the chest posteriorly, and in this situation bronchial breathing and bronchophony were distinctly audible. Above and below the space over which these signs were heard, slight crepitation was present. The sputa were rust-coloured and viscid. Pulse 96; respiration 44.

The patient was put upon an ounce and a half dose of the liquor ammoniæ citratis, every two hours; and turpentine stupes were ordered to be applied to the affected part of the chest, twice in the course of the day.

*Sixth day of the disease.*—On May the 29th the symptoms were much the same as on the previous day. Crepitation, however, was now audible in front of the right side of the chest, immediately below the mammæ. Bronchial breathing and bronchophony were still heard behind. The sputa were very tenacious and viscid, but only slightly tinged with rust colour. Pulse 104; respiration 38.

The urine was acid; of specific gravity 1015.

		100 parts of the solid matter.	
Water	. . . . .	950.90	—
Solid matter	. . . . .	49.10	—
Organic matter	. . . . .	35.53	92.73
Fixed salts	. . . . .	3.57	7.27
Chloride of sodium, not estimated.			—

<sup>1</sup> From the notes of Mr. T. Bridgwater.

The ash of this specimen of urine contained chloride.

The sputa were also subjected to analysis, with the following results:

		100 parts of the solid matter.
Water . . . . .	965.500	—
Solid matter . . . . .	34.500	—
Fixed salts . . . . .	7.206	20.88
Chloride of sodium . . . . .	4.373	12.67

*Seventh day of the disease.*—On May the 30th bronchial breathing could not be distinguished; but there still remained slight resonance of voice. Pulse 96; respiration 42.

On the following day, the sputa were found to be much less viscid, and the rust colour was now replaced by an orange-yellow tinge. Crepitation was still audible in the front of the chest, just at the end of a deep inspiration. On the back of the chest, large crepitation was heard. Pulse 72; respiration 28.

*Tenth day of the disease.*—On June the 2d the patient was sitting up. Crepitation was heard behind, at the end of inspiration, and slight resonance of voice still remained.

The urine was again submitted to examination. It was acid, and had a specific gravity of 1022.

		100 parts of the solid matter.
Water . . . . .	939.80	—
Solid matter . . . . .	60.20	—
Organic matter . . . . .	50.83	84.44
Fixed salts . . . . .	9.37	15.56

The salts contained distinct traces of chloride of sodium.

The patient gradually improved, and was discharged quite well on June the 11th, nineteen days from the commencement of his illness, and fourteen days after his admission.

CASE IX.<sup>1</sup>—James Flynn, æt. 44, an Irish labourer of very intemperate habits. He was a strong, healthy looking, working man, somewhat above the middle stature, with black curly hair and dark eyes. He stated that he had

<sup>1</sup> From the notes of Mr. J. Cheath.

never suffered from any form of illness previous to the present attack. This man was admitted into the hospital, under the care of Dr. Budd, on December the 16th, 1851.

The first symptoms appeared during the night of December the 13th, when he awoke from sleep with a sharp pain in the lower part of the right side. The pain was increased by coughing, or by taking a deep inspiration. Soon afterwards he felt hot and thirsty, and then, he said, he began to sweat a good deal. He also suffered from loss of appetite, but had not been seized with rigors. The patient said, that on the 13th, he worked very hard all day, and got wet footed, but, nevertheless, felt perfectly well when he went to bed.

*Second day of the disease.*—On December the 14th slight cough came on, and was accompanied with expectoration, which at first was colourless, but soon became of a brownish hue.

*Fourth day of the disease.*—On December the 16th he complained of much pain in the lower part of the right side, the pain being increased by cough, and also by locomotion. The cough was frequent, but not violent, and was accompanied by the expectoration of much rusty-coloured mucus, which rather inclined to a greenish hue, and was not very tenacious. The tongue was white and furred. The lower half of the right side of the chest behind, was found to be dull on percussion; in this situation, vocal vibration was increased, and the breathing was tubular in character. In other parts of the chest the respiration was vesicular, but loud, and the resonance was unimpaired, except in that portion of the chest which corresponds to the lower lobe of the right lung. Pulse 96; respiration 36.

He was ordered to take an ounce and a half of liquor ammoniæ citratis, with half a drachm of antimonial wine every three hours. A purge of sulphate and carbonate of magnesia was given, and turpentine stupes were applied to the affected part of the chest every two hours. He was put upon low diet and beef tea.

The urine passed in the evening of December the 16th was high coloured, of acid reaction, and of specific gravity 1022.

		100 parts of the solid matter.	
Water . . . . .	936.20	—	
Solid matter . . . . .	63.80	—	
Organic matter . . . . .	54.01	84.65	
Fixed salts . . . . .	9.79	15.35	
Chloride of sodium . . . . .	traces.		

The aqueous solution of the saline matter became only slightly milky upon the addition of a solution of nitrate of silver, and a few drops of nitric acid.

The salts consisted chiefly of sulphates.

*Fifth day of the disease.*—On December the 17th bronchial breathing was heard distinctly over the lower part of the chest behind, and it extended rather higher up the chest than the point at which tubular breathing had been audible the day before. Small crepitation was heard during inspiration. The patient said that the pain in the side had been somewhat relieved. The skin was moist. Pulse 96; respiration 28.

The sputa were slightly frothy, of a brown colour, and in consistence and general appearance, much resembled very thick mucilage. The reaction was neutral, and the specific gravity 1014.

Upon the application of heat a bulky precipitate of albumen was thrown down.

491.5 grains of the sputa were submitted to analysis, and the results calculated to 1000 parts.

		100 parts of the solid matter.	
Water . . . . .	944.97	—	
Solid matter . . . . .	55.03	—	
Albumen, mucus, blood-corpuscles, } insoluble in boiling water	34.12	62.00	
Extractive matter, soluble in boil- } ing water	12.84	23.33	
Fixed alkaline salts . . . . .	7.91	14.37	
Earthy salts . . . . .	.16	.29	
Chloride of sodium . . . . .	4.778	8.68	

*Sixth day of the disease.*—On the 18th, the same physical signs that were detected on the previous day were present over a much greater extent of surface, and the report says, that “nearly the whole of the right lung appeared to be involved in the inflammation.” Pulse 102; respiration 42.

In the evening, the pulse was 96, and the respiration 36. He was now ordered to take two grains of calomel, and a quarter of a grain of opium, every three hours, and a quarter of a grain of tartarised antimony with an ounce and a half of liquor ammoniæ citratis, as before.

*Seventh day of the disease.*—On December the 19th he was free from pain, but his cough was more frequent, and his sleep had been disturbed. Dulness was present over the lower two thirds of the right side of the chest, both before and behind. No breathing whatever was audible over the greater part of this portion of the chest, but quite at the lowest part, tubular breathing was present, with a little fine crepitation, and loud vesicular breathing was heard in the upper part of the right side, corresponding to the situation of the upper lobe of the right lung.

The patient had not been nauseated by the antimony, but he complained of drowsiness. The calomel and opium were ordered to be discontinued. Pulse 108; respiration 36.

The urine was of acid reaction, and its specific gravity was 1023.

		100 parts of the solid matter.	
Water	929.40	—	
Solid matter	70.60	—	
Organic matter	63.57	90.04	
Fixed salts	7.03	9.96	
Chloride of sodium	0	—	

The sputa exhibited a slightly acid reaction, and the specific gravity was 1028. The secretion was not so viscid as the specimen examined on the 17th. Upon the application of heat, or upon the addition of nitric acid, the mass became almost solid from the coagulation of albumen.

The sputa were tested for sugar by Trommer's test; when the solution was boiled, it became dark blue, and subsequently brown, but no suboxide was precipitated. The same phenomena were observed when the solution of double tartrate of copper (as employed by M. Bernard in his well known experiments) was substituted for the former test.<sup>1</sup>

<sup>1</sup> To Dr. Todd I am indebted for the suggestion of testing pneumonic sputa

495·2 grains of sputa were submitted to analysis, and the result calculated to 1000 parts.

		100 parts of the solid matter.	
Water . . . . .	902·06	—	
Solid matter . . . . .	97·94	—	
Albumen, &c., insoluble in boiling water }	51·45	.	52·53
Extractive matter, soluble in boiling water }	37·77	.	38·56
Fixed alkaline salts . .	8·27	.	8·44
Earthy salts . . . .	·45	.	·47
Chloride of sodium . .	4·251	.	4·34

*Eighth day of the disease.*—On the 20th the patient appeared to be in much the same state as on the previous day. The cough was somewhat looser, and the expectoration was abundant. Bronchial breathing was audible over the lower two thirds of the chest behind, and over the upper lobe, the respiratory sound was very loud, and mixed with crepitation. The breathing over the left side of the chest, was vesicular and puerile. Skin cool and perspiring. Pulse 132; respiration 42.

About 8, P.M., his breathing became much quicker and more feeble, and from this time he sank very rapidly, and died about an hour afterwards.

The sputa expectorated on the 20th were less viscid than on the day previously, and exhibited more of the prune-juice character. The reaction was very acid, and the specific gravity was 1032·8.

Upon boiling a portion with a solution of sulphate of copper and potash, much suboxide of copper was thrown down, and fell to the bottom of the test-tube, in the form of a pale brown precipitate, showing the presence of a considerable quantity of sugar in the sputa of this patient, the portion examined being the last that he expectorated. The presence of sugar was confirmed by the tartrate of copper

for sugar; he considered that if the views of Bernard, regarding the changes taking place during respiration, were correct, sugar ought to be present in the sputa of pneumonia in sufficient quantity to be recognised by the ordinary tests.

test. A portion of the sputa was examined by the microscope, and the following appearances were observed:—Numerous blood corpuscles were present, and much broken-down epithelium and granular matter, with cells of various forms having granular contents, were observed. There were also some granular cells which, in their general appearance, much resembled pus globules; but, upon the addition of acetic acid, no central nuclei-like bodies, so characteristic of the pus corpuscle, were developed. A few large and fine oil globules, with many small oil globules and much granular matter, were also present.

393·6 grs. were submitted to analysis, and the results calculated, as before, to 1000 parts :

		100 parts of the solid matter.
Water . . . . .	865·86	—
Solid matter . . . . .	134·14	—
Albumen, &c., insoluble in boiling water	56·325	41·99
Extractive matter, soluble in boiling water	67·150	50·07
Fixed alkaline salts . . . . .	9·830	7·32
Earthy salts . . . . .	·835	·62
Chloride of sodium . . . . .	3·842	2·86

A portion of the urine found in the bladder at the post-mortem examination (forty-two hours after death) was submitted to analysis. This specimen had a very offensive odour, was of acid reaction, and of specific gravity 1018. Separate portions were tested for sugar, with the two tests before mentioned, but not the slightest change, indicative of the presence of sugar, occurred.

		100 parts of the solid matter.
Water . . . . .	947·98	—
Solid matter . . . . .	52·02	—
Organic matter . . . . .	44·76	86·05
Fixed salts . . . . .	7·26	13·95
Chloride of sodium . . . . .	0	—

The fixed salts consisted chiefly of sulphates.

*Post-mortem (forty-two hours after death).*—Slight pleuritic adhesions, which were readily broken down, were found on the left side of the chest.

The right lung was completely hepatized, with the excep-

tions of a strip, about half an inch in depth, on the anterior aspect of the upper lobe, and also a superficial strip on the posterior surface of the lower lobe. In these situations, the tissue appeared healthy, and crepitation occurred upon slight pressure. In all other parts, the right lung was quite solid, and small pieces cut off in different parts of the organ, sank in water, and not even the slightest crepitation could be produced by firm pressure. The smaller bronchial tubes were completely choked up, some with coagulated blood, others with plugs of pure fibrin. Upon making sections of the lung, a few patches of grey hepatization were observed, and everywhere, the lung was easily broken down between the finger and thumb, into a dark red pulpy mass. From the freshly-cut surfaces, a prune-juice-like fluid was poured out, which in its appearance much resembled the sputa expectorated by the patient during the last two days of his life. The left lung was somewhat congested, but otherwise appeared healthy. In some places, however, patches of highly congested tissue were observed.

The heart was healthy; and nothing abnormal was observed in the condition of the liver or kidneys. No other organs were examined.

Being anxious to ascertain the changes which had taken place in the composition of the blood, more particularly with reference to the amount of chloride it contained, a portion, consisting of clot, colourless fibrin, and serum, was taken from the right side of the heart and was submitted to analysis. The amount operated on weighed 775·7 grs. The results obtained, being calculated to 1000 parts, gave the following as the composition of the blood:

			100 parts of the solid matter.	
Water	. . . . .	755·06	—	
Solid matter	. . . . .	244·94	—	
Extractive matter	. . . . .	17·50	.	7·15
Albumen, fibrin, and corpuscles	. . . . .	217·86	.	88·95
Fixed alkaline salts	. . . . .	6·99	.	2·85
Earthy salts	. . . . .	1·60	.	·65
Fatty matter	. . . . .	·99	.	·40
Chloride of sodium	. . . . .	1·69	.	·68

The fatty matter consisted almost entirely of cholesterin.

A portion of each lung was submitted to analysis, with the following results :

Analysis A represents the composition of that part of the right lung which was found in a state of red hepatization, the patches of grey hepatization being carefully excluded. The specific gravity of the portion selected, was 1051·6. 398·18 grs. were evaporated to dryness.

Analysis B represents the composition of the left lung, the portion selected for examination being that which appeared most healthy and free from congestion. 328·47 grs. were evaporated to dryness, and the result obtained calculated to 1000 parts, as in the previous analyses.

	A.	B.
Water . . . . .	817·00	832·65
Solid matter . . . . .	183·00	167·35
Extractive matter, soluble in water only	38·93	11·97
Extractive matter, soluble in water and alcohol, .S30 . . . . .	49·23	14·47
Alkaline fixed salts . . . . .	7·72	7·46
Earthy salts . . . . .	·93	2·71
Fatty matter . . . . .	18·84	13·57
Albumen, pulmonary tissue, vessels, &c.	67·35	117·17
Chloride of sodium . . . . .	2·59	1·43

From the data obtained in these analyses, the composition of 100 grs. of solid matter of the lungs was calculated :

	A.	B.
Solid matter . . . . .	100·00	100·00
Extractive matter, soluble in water only	21·27	7·15
Extractive matter, soluble in water and alcohol, .S30 . . . . .	26·90	8·65
Alkaline fixed salts . . . . .	4·22	4·46
Earthy salts . . . . .	·51	1·61
Fatty matter . . . . .	10·29	8·11
Albumen, pulmonary tissue, vessels, &c.	36·80	70·01
Chloride of sodium . . . . .	1·41	·85

The fatty matter obtained from the pneumonic lung consisted chiefly of dark brown oily fat, and only a few plates of cholesterin crystallised out upon slowly evaporating an

alcoholic solution, while from the alcoholic solution of the fat obtained from the healthy lung much cholesterol separated, in the form of beautiful and well-defined crystals.

A portion of an aqueous solution of the extractive matters soluble in boiling water, which was obtained from the hepatised lung, was tested with Trommer's test for sugar. Upon boiling, the mixture became of a beautiful dark purple colour, but no suboxide of copper was precipitated. The absence of any indications of the existence of sugar in the solution, when tested by Trommer's test, may be accounted for by the long interval of time which had elapsed since the man's death, before the application of the tests; for it has been shown that all traces of the presence of sugar in the liver, vanish a few hours after death. If, however, the liver of a person recently dead be tested for this substance, its existence may always be proved, according to the experiments of Bernard. Moreover, the indications of the presence of small quantities of sugar, might be entirely masked by the very deep colour which the solution assumed upon boiling; and it was therefore considered better to apply the yeast test, before any positive conclusion was adopted.

Twenty grains of the aqueous extract of each lung (obtained by treating the desiccated lung with boiling water, and subsequent evaporation of this solution to dryness,) were dissolved in two equal quantities of distilled water, and to each solution a similar amount of yeast was added, the mixture being placed in test-tubes inverted over mercury. A third test-tube of equal size to the former, was filled with distilled water mixed with the same quantity of yeast, as placed in the other tubes. The whole was kept in a warm place for two days, at the end of which period, the tubes were removed, and the bubble of gas which had formed was measured.

The tube containing yeast and water contained  $\cdot 04$  of a cubic inch of gas.

The tube containing the solution of the extract of the healthy lung was found to contain  $\cdot 06$  of a cubic inch of gas.

The third tube, in which the solution of the extract obtained from the hepatised lung was placed, contained .09 of a cubic inch of gas.

Although the amount of gas obtained in each case was so small absolutely, the difference in quantity is so striking in the three cases, that it appears to justify the inference of the presence of sugar, at least in the hepatised lung, if not also in the sound lung to a less degree. The blood was not tested for sugar.

The phenomena observed in the urine of the present case were very similar to those met with in the urine of other cases of pneumonia. A considerable increase in the quantity of the organic constituents, and great diminution in the relative amount of salts, with a total absence of chloride of sodium after the fourth day of the disease, will be noticed. It will be observed that the diminution of the salts did not proceed to so marked a degree as in several of the other cases, which fact is to be accounted for by the patient having taken a considerable quantity of sulphate of magnesia as a purgative, much of which salt escaped by the urine, and thus increased the amount of salts taken collectively.

An analysis of the sputa was made three times in the course of the disease, namely, on the fifth, seventh, and eighth days; and the chief changes which took place in its composition may be observed by reference to the following Table, in which the composition of 100 grs. of the solid residue of each specimen examined, with the reaction and specific gravity, are set down:

	Fifth day	Seventh day.	Eighth day.
Reaction . . .	neutral	slightly acid	very acid
Specific gravity . . .	1014	1028	1032.8
Solid matter . . .	100.00	100.00	100.00
Albumen &c., insoluble in boiling water . . .	62.00	52.53	41.99
Extractive matter, solu- ble in boiling water . . .	23.33	38.56	50.07
	85.33		91.09
Fixed alkaline salts . . .	14.37	8.44	7.32
Earthy salts . . .	.29	.17	.62
Chloride of sodium . . .	8.68	1.34	2.86

The changes which occurred in the reaction of the sputa from day to day, terminating in the production of very acid expectoration, may perhaps be referred to the development of an increased quantity of the peculiar acid which is formed in the lungs, and which, according to Verdeil, in healthy respiration is neutralised by the decomposition of the carbonate of soda of the blood, the soda uniting with the acid of the pulmonary tissue, and the carbonic acid being expelled in the process of respiration. In the latter stage of pneumonia, the circulation through the lung being retarded or completely obstructed, it seems not unreasonable to suppose that the necessarily diminished quantity of alkali brought to the lungs, in consequence of the impediment to the circulation, is insufficient to neutralise the free acid secreted by the pulmonary parenchyma, which, therefore, accumulates, and causes the sputa to exhibit a highly acid reaction.

The increasing specific gravity of the sputa depended chiefly on the increasing amount of solid constituents which these specimens were found to contain. The first specimen of expectoration contained 55.03 grs. of solid matter in 1000 grs., the second 97.94 grs., and the third 134.12, in the same quantity. This increase of the solid matter in the sputa as the disease progressed towards a fatal termination, is perhaps no more than would have been anticipated, and may doubtless be referred to the gradual softening and breaking down of the inflammatory products effused into the air-cells of the lung, and is also, perhaps, in part dependant upon the destruction of the pulmonary tissue itself. The vessels distributed on the air-cells being either entirely destroyed or rendered quite impervious, it becomes altogether impossible that any of the disintegrating mass can be absorbed; and hence it continues to be expectorated, until this last effort of nature for its removal becomes thwarted by the complete failure of the patient's strength, which terminates in his death.

The next point worthy of notice in the above analyses is

the gradual increase, from day to day, of the extractive matter soluble in boiling water, at the expense of the albumen, fibrine, and blood-corpuscles contained in the sputa. In the second and third analyses this is well shown; for while the united quantities remain very nearly the same in each case, it is to be noticed that on the seventh day of the disease the *insoluble* matter amounted to 52·53 and the *soluble* to 38·56; but in the analysis of the sputa on the following day these figures were nearly transposed, the *insoluble matter* being then diminished to 41·99, while the soluble portion was increased to 50·07; or, taking the three analyses together, we find the insoluble portion on the three days represented, in round numbers, as follows: 62, 52, 42, and the soluble matter by the numbers 23, 38, 50. Hence it appears that the albumen and fibrin, which are probably the chief substances concerned in the changes which take place in the production of hepatization of the lung, and which, especially the latter, enter largely into the composition of the sputa, become, at a certain period of the disease, so altered in their chemical characters, as to partake more of the nature of extractive matters, which are soluble in boiling water, and in their general appearance and taste agree with the extractive matter of the blood. This tends to show that the extractives may, under some circumstances, be produced by the immediate metamorphosis of albuminous matter.

The diminution from day to day in the quantity of fixed salts in the sputa, depends doubtless upon the gradual elimination of the saline matter from the blood, without a compensating amount being taken among the ingesta; and the gradually decreasing quantity of the fixed salts in the urine, so well marked in some of the cases reported, depends partly on the same cause; but I believe that the diminution is also, in great measure, due to the determination of the saline matter to the inflamed pulmonary tissue; for it may be remarked in Cases I, III, VI, and VII, that as soon as resolution was fully set up, and the patient was decidedly progressing

towards recovery, a great increase in the relative amount of salts excreted by the urine occurred, while no change which would account for such an alteration had been made in the patient's diet, or in the treatment to which he was subjected.

That in such a morbid condition of lung a certain amount of attraction for the saline constituents of the blood really exists, is borne out by the fact, that while 1000 grs. of sputa expectorated just before death contained 9.83 grs. of fixed salts, the same quantity of blood taken from the heart after death was found to contain only 6.99 grs.; or in 100 grs. of the solid matter of the sputa 7.32, while in 100 grs. of the solid matter of the blood only 2.85 grs. of fixed salts were present.

The amount of fixed chloride present in the sputa was estimated in Cases III, VII, and VIII; and in each instance a considerable proportion was found to be present. At the same time it was shown that mere traces of this salt existed in the urine, or it was entirely absent from this fluid; from which it was inferred that the amount of chloride of sodium present in the blood was considerably less than would be found in a state of health. The solid matter of healthy urine usually contains about five per cent. of fixed chloride. In Case VII it was proved experimentally that the amount of fixed chloride in the urine might be taken as a rough index of the quantity existing in the serum at the same period; for the solid matter of the urine was found to contain rather more than the healthy proportion of this salt, and an excess was also present in the serum obtained from a blister. In the last case reported a deficiency of salt was found in the blood, while the urine did not contain a trace.

In the following Table I have introduced, for the sake of comparison with the composition of the sputa in the three cases of pneumonia just referred to, an analysis of the mucus of the nostrils and trachea by Berzelius, and an analysis of a tracheal and bronchial mucus, obtained from a patient who died during the existence of active symptoms of influenza,

by Dr. Wright.<sup>1</sup> In order that the results obtained by myself, with reference to the peculiar character of the pneumonic sputum, may be the more readily compared with those obtained by Berzelius in healthy sputum, and by Dr. Wright in the sputum of influenza, I have reduced the two latter analyses to the per-centage composition of the solid matter, and have altered their form of expression for the convenience of tabulation :

	Berzelius.	Influenza. Dr. Wright.	Pneumonia. Case 3.	Pneumonia. Case 7.	Pneumonia. Case 8.
Solid matter	. 100·0	. 100·0	. 100·00	. 100·00	. 100·00
Fixed salts	. —	11·9	. 24·78	. 32·86	. 20·67
Chloride of sodium	8·4	. —	. 10·12	. 18·11	. 12·67

In Berzelius' analysis, the total quantity of fixed salts did not probably exceed 12 or 14 grs. in 100 of solid matter; and it is obvious that in Dr. Wright's analysis the chloride did not nearly amount to the quantity present in the three other cases, since the total quantity of salts was only 11·9 grs.

The expectoration in the case of Flynn (Case ix) formed

<sup>1</sup> Dr. Wright's Papers on the Pathology of Expectoration.—'Medical Times,' vol. xi, p. 200; 1845.

*Berzelius' Analysis.*

Water	. . . . .	933·9
Mucous substance	. . . . .	53·3
Muriate of potash and soda	. . . . .	5·6
Lactate of soda and animal matter	. . . . .	3·0
Soda	. . . . .	·9
Phosphate of soda and animal matter	. . . . .	3·3

*Dr. Wright's Analysis.*

Water	. . . . .	956·5
Mucus	. . . . .	32·1
Albumen (coagulated)	. . . . .	4·3
Muriates	} Potash } Soda }	5·2
Lactates		
Phosphates		
Free acid (a trace).		
Loss	. . . . .	1·9

an apparent exception to that of the cases above referred to, for an unusually small quantity of chloride was present, and by reference to the analysis of the sputa on the fifth, seventh, and eighth days of the disease, a gradual decrease in the amount of fixed chloride will be observed, which cannot but be regarded as an interesting point in the pathological changes which accompany pneumonia, when considered in connection with those which were taking place in the chemical composition and microscopical characters of the matter poured out into the air-cells of the lung. This decrease in quantity of the alkaline salts generally, and more especially of the chloride of sodium, is probably intimately connected with the softening and breaking down of the solidified lung into a soft and pulpy mass. It has been long known that chloride of sodium acts as a powerful preventive of the decomposition and destructive disintegration of animal substances, and its great importance to the process of cell development and growth will be presently considered.

Although the amount of chloride present in a certain quantity of sputa in Case ix was unusually small, it nevertheless considerably exceeded the proportion in the blood at the same period of the disease, (in the last analysis 1000 grains of sputa contained 3·842 grains of chloride of sodium, while only 1·69 were present in a similar quantity of blood, or in 1000 grains of solid matter 2·86 in the former and ·68 in the latter.) In all the other specimens of sputa subjected to examination a considerable proportion of this salt was found to exist, although it was entirely absent in the urine, or traces only were detected. In the case of Regan, the solid matter of the sputa contained a very large proportion of salt, which, in conjunction with other facts, I considered as tending to show that in pneumonia there existed a determination of chloride of sodium to the inflamed lung. It appears difficult to account for the presence of so great an excess in the sputa unless the existence of some attractive force be admitted, particularly as it has been

shown that if an excess of chloride exist in the blood, a considerable quantity is excreted by the kidneys. Hence, if a large proportion of chloride be found to be present in the sputa, as in the cases above mentioned, and there exists in the blood, at the time of the secretion of the sputa, a proportion less than that found in health, as was shown by the existence of mere traces in the urine, it follows, I think, that the excess of chloride in the sputa depends upon an exalted attraction for chloride on the part of those textures concerned in the formation of the characteristic expectoration of pneumonia. The precise tissue concerned in the secretion of the viscid sputa which contains so much chloride is probably the mucous membrane of the smaller bronchial tubes, for it has doubtless the office of separating a certain quantity of saline matter from the blood in a state of health, and therefore when the mucous membrane is inflamed, and cell formation is more actively taking place in the finer ramifications of the bronchial tubes, a more abundant secretion of the substances concerned in the building up of these cells must take place. The development of mucous corpuscles, and those peculiar cells containing minute oil globules, which are usually found in the ordinary pulmonary mucus, and which are so abundant in the sputa of pneumonia, is probably intimately connected with this separation of saline matter from the blood.

Whether chloride of sodium be essentially necessary to the growth and development of the peculiar non-nucleated cells, to which reference has just been made, I have not yet been able to determine by my own observations; but in many instances in which these bodies were abundant, the presence of much saline matter which contained a considerable proportion of chloride of sodium was proved.

In the mucus expectorated in pneumonia, provided there exists in the system a sufficient quantity of chloride of sodium (although this may be much less than is present in health) there appears to be present a greater proportion of this salt relatively to the amount of the other constituents

of the sputa than in healthy pulmonary mucus, but in cases in which the disease had continued for some days, so that time had been allowed for the elimination of much chloride from the system in the expectoration, while little or none had been taken in the food, an excess in the per-centage of chloride in the sputa can scarcely be expected.

Although only a small proportion of the chloride may be found in a given quantity of the sputa submitted to analysis, yet when this was calculated in the total quantity of sputa expectorated, and added to the amount present in the inflammatory exudation still remaining in the lung, the whole quantity would be something considerable, particularly in a case like that of Flynn (Case ix) where one lung was completely hepatized. It cannot be urged as an argument against this supposed exalted attraction of the inflamed lung for fixed chloride, that the relative proportion in a certain quantity of sputa more nearly approximates to the amount present in a similar quantity of blood than in health, for, in consequence of the affinity of albumen for a certain quantity of chloride of sodium, (it being quite impossible to separate all traces of this salt from albumen by washing,) it follows that the excretion of the salt from the blood cannot continue until this fluid is completely deprived of it. If, however, the ordinary amount of chloride were present in the system generally, which may be inferred if the urine is found to contain its normal proportion, the relation existing between the amount present in given quantities of blood and sputa, or in a certain quantity of the solid matter of these two fluids, would be found to exhibit a more striking difference, than when the chloride of sodium existing in the system is reduced to a standard much below that of health. An example may perhaps render my meaning more intelligible.

In Flynn's sputa (Case ix), just previous to his death, after much chloride had been removed from the system, while a considerable quantity still remained in the lung, and when the urine for several days had ceased to afford

the slightest indication of the presence of this salt, 100 grs. of the solid matter were found to contain only 2·86 of chloride, while the solid matter of the blood contained ·68 per cent., which is in the proportion of about four to one. In Hasse's analysis the difference in quantity would be considerably greater, and would be somewhat less than eight to one, or nearly double. However, upon reference to the analysis in Regan's case (Case VII), where the chloride in the system did not exceed the healthy standard, for the urine only exhibited traces of the salt, the sputa expectorated upon the same day as that on which the urine was examined contained in 100 grs. of solid matter as much as 18·11 grs. of fixed chloride, which would be in the proportion of nearly ten to one, (that is, supposing his blood at the time to contain as much chloride as is present in a state of health, which there is reason to believe was not the case at this period.) Two days later, when resolution of the inflammation was clearly taking place, the urine was found to contain 6·51 in 100 grs. of the solid matter, and the serum 8·93 grs. in the same quantity, which unquestionably showed that the chloride originally effused into the inflamed lung had been re-absorbed by the blood, and was now passing off in the urine.

The determination of chloride of sodium to the inflamed lung in cases of pneumonia, is perhaps a fact, which, from analogy we should expect to find; for, from the analyses of various observers, it appears that a large quantity of chloride of sodium is present whenever the metamorphoses of tissues depending upon cell development is going on; and that such an increase of the chloride should be observed to take place in those pathological conditions in which cell formation takes so active a part, is exactly what one would expect, seeing that the farther investigation is carried, the greater reason do we find for believing that the pathological changes which are observed in various tissues are governed by, and take place in obedience to the same fixed laws which regulate certain physiological changes, but acting under different relations.

In reference to this interesting point it may be remarked generally, that in a state of health those secretions which are elaborated by an abundant formation of epithelium contain a greater proportion of chloride of sodium than is present in those fluids which are poured forth from surfaces covered sparingly with epithelium, which, perhaps, takes but a small part in the secreting process. Of instances of the former class of secretions, may be mentioned the saliva, the gastric juice, the sweat, the tears, and mucous secretions generally,—among the latter class, the milk, and the secretions of serous and synovial membranes in health, may be referred to as examples. Urine may be placed intermediately between these two classes, and biliary secretion is found to contain less chloride than urine; but much more than is found in milk.

In the development of tissues in the embryo, a large proportion of fixed chloride is present. In the growing femur of a six months' fœtus, Lehmann found 10·138 per cent. of chloride in the ash, while from the ash of adult bones he could only extract from 0·7 to 1·5 per cent.; and Voigt found in the liquor amnii of a fœtus, about the fourth month, 5·95 per 1000 parts, while in the sixth month he only obtained 2·4 in the same quantity.

The peculiar sallowness of the complexion which has often been observed to ensue after the occurrence of hepatisation of the lung, in cases of pneumonia, may be due, in part at least, to the altered colour which the blood assumes in consequence of a deficient quantity of chloride of sodium, for the mere circulation of blood which had been but imperfectly aerated, would not account for the chlorotic appearance which is often present. A deficiency of chloride of sodium in the blood has been observed by Mulder, and others, in cases of cholera; and a marked diminution has been met with in chlorosis, by Becquerel and Rodier, who found only 2·6 grs. per 1000 in one instance of this disease, in which, however, the corpuscles amounted to 123·8, and the solid matter to 201·4 per 1000.

In the case of Flynn, where the sallowness of the complexion was well-marked, and came on soon after the occurrence of hepatization, I found that the blood contained only 1.69 per 1000, although the solid constituents amounted to 244.94. This man upon his admission had a very florid complexion. It is not improbable, that the excess of chloride of sodium in the sputa of pneumonia produces that modification in the colouring matter of the blood that is effused, which distinguishes pneumonic expectoration from every other form.

Chloride of sodium forms one of the most important saline constituents of the animal body, and in many of the secretions the quantity of this salt equals, or even exceeds that of all the other inorganic ingredients put together; notwithstanding its great abundance in many of the animal juices, the variation in quantity of the salt in different secretions, or in the same secretion under certain altered conditions has as yet scarcely received that attention from pathologists which the subject appears to deserve.

The high diffusive power of common salt, as has been shown by Professor Graham,—the readiness with which it permeates, animal tissues,—its great solubility in water,—its preservative powers—its wide distribution over the surface of the earth, and throughout the whole organic kingdom—the avidity with which it is sought after by man and animals, which for a time have been deprived of its use,—and its abundance in growing embryonic tissues, which in their mature state contain only traces of it, all point to its importance as a constituent of the living organism; and the study of the different quantities of salt existing in various tissues in a state of health, and also under certain morbid conditions, appears to me likely to elicit some interesting points in reference to the especial part performed by the salt in cases of cell growth and multiplication, and the importance of the salt to reparative action suggests the propriety of supplying our patients with a sufficient quantity in certain cases of disease.

The most important changes which take place in the chemical composition of the lung when it becomes hepatised, are represented in the following analysis :

In comparing an analysis of hepatised lung with one of sound lung, it may be observed that the comparison is not made between equal *bulks* of pulmonary tissue, but between equal weights of lung, in two very different states, and hence the difference in composition is perhaps not quite so great as might at first be expected. In an analysis of a certain weight of sound lung, the composition of the lung tissues with a certain proportion of blood contained in the capillaries, is represented, while an analysis of a portion of hepatised lung represents very nearly the composition of the adventitious matter upon the effusion of which the solidification depends, for the proportion of lung tissue compared to that of the inflammatory products is so small, that its presence may be almost entirely disregarded—the analysis of healthy lung will represent the chemical composition of a considerable part of one lobe, but that of the inflamed lung represents the composition of only a very small part of the portion of lung which has undergone hepatisation.

Where inflammation has involved a considerable portion or the whole of one lung, the quantity of salts per cent., and the amount of chloride of sodium present, will be found to be less than if only a small portion of the lung had been affected, in consequence of the salt being distributed over a greater amount of space in the former, than in the latter case.

The analyses of both lungs of Flynn (Case ix,) will be found at pages 357, 358, to which the reader is referred for the results.

The specimens of lung referred to in the following analyses, were taken from patients whose secretions were not subjected to examination during life.

The lung, of which the following is an analysis, was apparently healthy. It was of a pale colour, with little blood in the vessels, and the air-cells were well filled with air. The lung was taken from a patient, æt. 49, who died in King's College

Hospital from the exhaustion consequent upon contracted pylorus, which depended on the thickening and contraction produced by the presence of two large ulcers situated in the pyloric orifice. This man suffered much from frequently vomiting a large quantity of the characteristic fermented vomit containing *sarcinæ*.

			100 parts of the solid matter.
Water . . . . .	778·64	—	
Solid matter . . . . .	221·36	—	
Extractive matter soluble in } water only . . . . .	30·12	13·60	
Extractive matter soluble in } water and alcohol ·830 . . . . .	23·91	10·50	
Fixed alkaline salts . . . . .	10·15	4·58	
Earthy salts . . . . .	2·52	1·13	
Fatty matter (of which 5·91 } consisted of cholesterin) . . . . .	19·19	8·67	
Albumen, pulmonary tissue, } vessels, &c. . . . .	135·47	61·19	
Chloride of sodium . . . . .	2·72	1·22	

The following is an analysis of a portion of lung in the state of red hepatization, which was taken from a man, æt. 27, who died in the hospital the day after his admission. No history of his case was recorded. The lower lobe of the left lung was hepatized in every part, and small portions that were cut off and thrown into water immediately sank.

			100 parts of the solid matter.
Water . . . . .	842·70	—	
Solid matter . . . . .	157·30	—	
Albumen, vessels, &c., insoluble in } boiling water . . . . .	109·00	69·29	
Fatty matter . . . . .	10·23	6·50	
Extractive matter soluble in boiling water . . . . .	28·73	18·26	
Soluble fixed salts . . . . .	8·86	5·63	
Earthy salts . . . . .	·48	·30	
Chloride of sodium . . . . .	2·55	1·62	

The lung, of which the following is an analysis, was taken from a patient of the name of Jane Roberts, æt. 34, who died in the hospital suddenly in consequence of rupture of

an aortic aneurism into one of the bronchial tubes. The patient had been admitted in consequence of effusion into the cavity of the pleura of the left side. The left lung was about half the natural size, of a grey colour, and quite solid. It appeared to be in a state of grey hepatization rather than carnified.

941·6 grains were submitted to analysis, and the results obtained calculated to 1000 grains.

				100 parts of the solid matter.	
Water	.	.	.	815·50	—
Solid matter	.	.	.	148·50	—
Albumen, vessels, &c., insoluble in	}	boiling water	.	100·00	67·34
Fatty matter			.	15·30	10·30
Extractive matter soluble in boiling	}	water	.	22·50	15·15
Soluble fixed salts			.	9·40	6·33
Earthy salts	.	.	.	1·30	·87

The soluble fixed salts contained—

Sulphate of soda	.	.	·66	·44
Chloride of sodium	.	.	5·38	3·62

TABLE I.

*Showing the quantities of the principal Constituents in 100 parts of solid matter of the Urine in the different cases.*

No. of Case	1.					2.	3.			4.	5.	
Specific gravity ..	1017	1013	1016	1022	1016	—	1017	1013	1020	1025	1026	1020
Solid matter ....	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
Organic matter ..	92·82	—	97·05	93·6	73·61	89·55	93·23	97·92	92·91	93·48	85·82	81·69
Fixed salts .....	7·18	—	2·95	6·4	26·39	10·45	6·77	2·28	7·09	6·52	14·18	18·31
Chloride of sodium	0	traces	0	0	14·43	traces	0	0	0	0	traces	0

No of Case	6.			7.		8.		9.		
Specific gravity ..	1022	1022	1026	1018	1020	1015	1022	1022	1023	1018
Solid matter ....	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
Organic matter ..	88·27	94·30	89·00	93·05	79·08	92·73	84·34	84·65	90·04	86·05
Fixed salts .....	11·73	5·70	11·00	6·95	20·92	7·27	15·56	15·35	9·96	13·95
Chloride of sodium	0	0	0	traces	6·51	not estimated	traces	traces	0	0

TABLE II.

*Showing the quantities of the inorganic Constituents in 100 parts of solid matter in the specimens of Sputa.*

No. of Case	3	7	8	9		
Specific gravity . .	—	—	—	1014	1028	1032·8
Solid matter . .	100·00	100·00	100·00	100·00	100·00	100·00
Fixed salts . .	24·78	32·56	20·88	14·37	8·44	7·32
Chloride of sodium .	10·12	18·11	12·67	8·68	4·34	2·86

TABLE III.

*Showing the quantities of the principal Constituents in 100 parts of solid matter of the different specimens of Lung.*

	Healthy Lung.	Congested Lung. (9.)	Hepatized Lung. (9.)	Grey Hepatization.	Red Hepatization.
Solid matter . .	100·00	100·00	100·00	100·00	100·00
Extractive matter, soluble in water only	13·60	7·15	21·27	15·15	18·26
Extractive matter, soluble in water and alcohol ·830 . .	10·80	8·65	26·90		
Fixed alkaline salts . .	4·58	4·46	4·22	6·33	5·63
Earthy salts . .	1·13	1·61	·51	·87	·30
Fatty matter . .	8·67	8·11	10·29	10·30	6·50
Albumen, pulmonary tissue, vessels, &c.	61·19	70·01	36·80	67·34	69·29
Chloride of sodium .	1·22	·85	1·41	3·62	1·62

The most important points which I have endeavoured to establish in this communication, are as follow :

1. That in pneumonia there is a total absence of chloride of sodium from the urine, at or about the period of hepatization of the lung.

2. That soon after resolution of the inflammation, the chloride becomes restored to the urine, and often in considerable quantity.<sup>1</sup>

3. That at this period the serum of the blood is found to contain a greater amount of chloride than in health.

4. That the presence of chloride of sodium in the urine

<sup>1</sup> The first and second conclusions are confirmatory of Dr. Redtenbacher's observations.

may be taken as evidence of the existence of a greater quantity of the salt in the blood, than is required for the wants of the system generally, or at least of an amount sufficient for that purpose; and that the absence of the salt from the urine indicates that the circulating fluid contains less than the normal quantity.

5. That the sputa in pneumonia contain a greater quantity of fixed chloride than healthy pulmonary mucus, if there be not much less than a normal amount in the blood, although there be a complete absence of the salt from the urine. In all cases, however, there is found in the sputa a quantity many times greater than exists in an equal amount of blood at the same period of the disease. The absolute amount present is subject to variation at different periods of the disease, and in different cases.

6. That in Case ix, as the disease approached a fatal termination, the proportion of chloride present in the sputa underwent a decrease, while the amount of solid matter, and especially the extractive matters, increased in quantity. At the same time the sputa became acid, and in the matters expectorated within the last few hours of the patient's life, there existed evidence of the presence of a large quantity of grape sugar, but in that obtained on the day previous to his death none could be detected.

7. That there is reason to believe, that the absence of the chloride of sodium from the urine during the stage of hepatization, depends upon a determination of this salt to the inflamed lung, and that when resolution occurs, this force of attraction ceases, and whatever salt has been retained in the lung is reabsorbed, and appears in the urine in the usual way.



A MEMOIR  
ON THE  
PATHOLOGY AND TREATMENT  
OF  
LEUCORRHŒA,  
BASED UPON THE  
MICROSCOPICAL ANATOMY OF THE OS AND CERVIX UTERI.

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VARIOUS authors, writing on the subject of Leucorrhœa, have described the external qualities of the different kinds of discharge met with in this affection. But their descriptions contain many discrepancies, which, it occurred to me, might be explained by a microscopical examination of the vaginal and uterine discharges in cases of leucorrhœa. I was not without hope that some light might in this way be thrown upon the pathological conditions on which these morbid secretions depend. Accordingly, I procured the examination of the leucorrhœal secretions in every suitable case which came under my care at St. Mary's Hospital during many months. But the results of this examination were hardly such as might have been anticipated. The opaque, curdy, and creamy discharge found lying upon the surface of the vagina and the external portion of the cervix uteri, seems to the naked eye widely different from the viscid, transparent secretion seen issuing from the cervix uteri. Yet, under the microscope, both were found to consist of nearly the same elements, namely,—mucus or pus globules and epithelial particles, involved in a thick tenacious plasma. The only

difference appeared to be in the relative quantity of squamous epithelium and mucous corpuscles. In the vaginal secretion the epithelium was in greatest abundance, while mucous corpuscles were in excess in the secretion from the canal of the cervix. It was evident, however, that the physical qualities of the discharges did not depend upon these variations, as the opaque, curdy, and the transparent viscid secretions were sometimes quite identical in their microscopical appearances. It became, therefore, an object to ascertain the precise structures which secreted these discharges, and the causes which modified their sensible and microscopical appearances. In this way I was led to examine the mucous surfaces of the vagina, the vaginal portion of the os and cervix, and the canal of the cervix uteri. But though I commenced the present investigation with an examination of the leucorrhœal secretions, and was only subsequently led to examine the tissues which produce them, I must beg leave to invert this order of proceeding, and direct the attention of the Society, in the first instance, to the minute anatomy of the os and cervix uteri. In this place I ought to mention, and I do so with the warmest thanks, that in the microscopical part of the investigation, I am under great obligations both to my friend Dr. A. H. Hassall, and to my colleague Dr. Handfield Jones. Without their valuable aid, it would have been impossible for me to have prosecuted the subject successfully. Dr. Hassall made with me an examination of the entire anatomy of the os and cervix uteri, to which, indeed, his attention had been directed before I applied to him for this purpose. To Dr. Handfield Jones I owe a large number of examinations of the leucorrhœal secretions made at the commencement of the present inquiry. I have also received much assistance, in the way of procuring healthy and morbid uteri, from Dr. J. W. Ogle, curator of the museum at St. George's Hospital; and from Messrs. Trotter and Bullock, the resident medical officers of St. Mary's Hospital.

Like the mucous membrane in other parts of the body, the mucous covering of the os and cervix uteri consists of—

1, epithelium; 2, primary or basement membrane; and, 3, fibrous tissue, blood-vessels, and nerves. But there are numerous points of special character belonging to the mucous membrane in this situation; and, for convenience of description, the os and cervix uteri may be divided into two parts, one comprising the mucous membrane of the os uteri and external portion of the cervix; the other the mucous lining of the cervical cavity or canal. In the first place, I proceed to describe the mucous membrane of the os uteri and external portion of the cervix,—that which lies between the junction of the cervix uteri with the vagina, and the margin at which the mucous membrane of the os uteri becomes continuous with the mucous lining of the canal of the cervix.

The epithelial layer found in this situation is tessellated or squamous, and is so arranged as to form a membrane of considerable thickness. After maceration in water for a few days, it can readily be raised from the surface of the mucous membrane. It closely resembles the epithelial covering of the vagina, with which it is continuous.

Immediately beneath the layer of epithelium the basement membrane is found, covering numerous villi or papillæ, which stud the whole of the surface. These villi are sufficiently large in some specimens to be seen with the naked eye, if a section is held to the light. When the villi are partially or wholly denuded of epithelium by maceration after death, or in certain diseased conditions, an uneven appearance is given to the os uteri. These villi are generally single, but occasionally two or three are united together upon one pedicle.

When examined by a high power in a recent specimen, each villus is found to contain a looped blood-vessel, which may be seen passing to the end of the villus, and returning to its base, where it inosculates with the blood-vessels of the neighbouring villi. These villi are everywhere covered by pavement epithelium, which also fills up the intervals between them, rendering the external surface smooth, as seen by the naked eye. (Fig. 1, plate 11.)

The surface of the os uteri is generally described as containing numerous mucous follicles. But under the microscope it is difficult to make out any distinct follicular structure. On looking at a section taken from the os uteri, an appearance very similar to that presented by mucous follicles is observed; but on a closer examination it is found that the dark spots, although depressed in the centre, are slightly elevated, and contain dark-red points, which are the terminations of the looped blood-vessels of the villi. These appearances seem in fact to be nothing more than the villi obscured by their epithelial covering. In examining different parts of the same specimen, we may see that what at first appears to be depressions are, in reality, slight elevations. (Fig. 1, plate III.)

If a thin portion be sliced from the surface of the mucous membrane in this situation, and examined with a high power, the points of the villi appear nipple-shaped, and the whole surface is studded with eminences. Around the bases of the projections and immediately above them, the epithelial scales are more numerous, crowded, and narrow in shape, than in the interspaces. In the centre of each villus a slight depression is seen, which suggests the probability that the extremities of the villi may be more particularly concerned in the production of the vaginal mucus. (Fig. 1, plate I.)

The thick layer of scaly epithelium and the villi, with their looped vessels, are the principal anatomical features of the mucous membrane of the os uteri and external portion of the cervix; and it will be seen in the sequel that both villi and epithelium play an important part in the pathological changes which occur in the lower segment of the uterus in leucorrhœa.

On passing within the os uteri to examine the mucous lining of the cervical canal, a small tract of smooth surface is generally found between the margin of the lips of the os uteri and the commencement of the penniform rugæ. Sometimes, however, there is only a slight rim between the os uteri and the lower rugæ, and occasionally the rugæ

extend so low down, that they may be seen at the os uteri itself. Where this smooth surface exists, as it does in most specimens to some extent, the mucous membrane appears to the naked eye more delicate than the mucous membrane of the external portion of the os uteri. But whether rugose or smooth, the mucous membrane of this portion of the cervix consists of the same element, with the addition of mucous follicles, wherever rugæ are present. Examined by the microscope, the mucous membrane immediately within the os is found to be composed of cylinder epithelium arranged upon villi, somewhat after the manner of the epithelium covering the villi of the intestinal canal, of basement membrane, and of villi, three or four times larger than the villi of the external portion of the os uteri. Occasionally, the villi in this situation are compound, consisting of two or three, or even four villi, arising from a single stalk. They are covered, as well as the spaces between them, with cylinder epithelium, dentated in shape. They contain looped blood-vessels, and situated between the blood-vessels and the basement membrane, numerous oil globules, many of them of large size, are found, as well as an abundance of small granular cells. In some specimens, two of the vascular loops may be seen in a single villus, when the villi are of large size. At the bases of the villi, their blood-vessels inosculate everywhere freely, as in the case of the villi outside upon the os uteri.<sup>1</sup> (Fig. 2, plate 11.)

<sup>1</sup> I first saw the villi or papillæ of the os and cervix uteri with Dr. Handfield Jones, but I afterwards found they had been observed previously, and a drawing made of them, by Dr. Hassall, (fig. 2, plate 1.) After the reading of my paper, Mr. Kiernan informed me that he had frequently seen them when examining the uterus. My attention has been directed, more recently, to a description of them in an able essay by the late Dr. Franz M. Kilian, of Bonn, on the structure of the uterus in animals, "*Die Structur des Uterus bei Thieren*," published in vol. ix of Henle and Pfeufer's '*Zeitschrift*,' 1850. In this article Dr. Kilian, after describing the sensitive papillæ of the vagina, gives a description of the papillæ of the os and cervix uteri and the cervical canal. These structures are spoken of as threadlike or filiform upon the os uteri, and are considered sensitive in function. The

Underneath the villi, both in the lower part of the cervical canal and upon the external surface of the os and cervix uteri, a dense fibrous and vascular tissue is found mixed with involuntary muscular fibres and nerve fibres; the muscular fibre becoming more plentiful on descending deeply into the structure of the walls of the cervix.

The next division of the subject includes the description of the proper glandular structure of the canal of the cervix uteri.

When the cavity of a cervix uteri belonging to an organ which has never been impregnated is laid open by a longitudinal incision, so as to expose the whole of the cervical canal, the internal surface is generally found to contain four columns of rugæ, or folds of mucous membrane, arranged in an oblique, curved, or transverse direction. Between these columns of rugæ, four longitudinal grooves or ridges are sometimes observed. Of these, the two grooves in the median line anteriorly and posteriorly, are the most distinct. The other longitudinal channels are situated one on each side, between the anterior and posterior walls of the cervix, beginning at the angles dividing the anterior and posterior lips of the os uteri. The canal of the cervix is flattened in shape, and two of the rugous columns are arranged on the anterior surface corresponding to the anterior lip, and the other two upon the posterior, the posterior portion of the cervix being the largest, and containing the greatest number of rugæ. The sulcus, or division between the posterior rugous columns, is also generally more strongly marked than the anterior division. The rugæ, as seen in each column by the eye alone, vary from about ten to fifteen in number. In the intervals between the columns, small longitudinal folds can be seen, but these

sensitive papillæ within the os uteri are described as tuberculated in shape, and considerably larger than the filiform papillæ of the os uteri, and as being deeply sunk in the mucous membrane. At the upper part of the cervical canal the papillæ are said to approach again in shape and size to the papillæ of the os uteri. Rude lithographic figures of the papillæ, as seen by a low power, are given, but they do not exhibit, with any accuracy, the intimate structure of these bodies.

are less distinct than the transverse rugæ. In the normal state, the transverse rugæ with the fossæ between them, are filled with viscid semi-transparent mucus, and when this is drawn out or brushed away, a reticulated appearance, caused by numerous secondary rugæ, is visible in the mucous membrane beneath. At some points of the fossæ the mucous crypts are deeper than at others; and here and there minute openings are seen at the bottom of the pits, into which fine bristles may be readily passed to the distance of the twelfth of an inch. In some specimens, the rugæ are arranged closely together, as thin laminae, with deep divisions between them. In all anatomical works, mucous follicles and lacunæ are mentioned as being numerous in the canal of the cervix uteri and between the penniform rugæ, but the subject is generally dismissed in a few words, and I am not aware that any minute description of the cavity of the cervix uteri, and the arrangements of its mucous membrane, even as they may be seen by the naked eye, has hitherto been given. Names too often hide the real significance of things, and the terms penniform rugæ, palmæ plicatæ, glandulæ Nabothi, and arbor vitæ uterinus, would seem in this instance to have been received in lieu of more accurate description.

Besides the four rugous columns and the furrows between them, other rugæ of irregular shape are seen, particularly at the upper and lower portions of the cervix where the regular transverse or oblique rugæ become indistinct. In the virgin state, these arrangements of the mucous membrane occur with tolerable regularity, but after child-bearing, they become to some extent confused and irregular, though the follicular structure of course remains. Probably, it is owing to the great extent of the reduplication of the mucous membrane of the cervix, that laceration of the mucous surface does not more frequently occur during parturition. In pregnant women, or in cases in which the cervix uteri is unusually developed, as in long-standing leucorrhœa, polypus, prolapsus, or procidentia, the rugæ or folds are considerably increased in size.

Although the columnar arrangement now described is generally met with in the cervix uteri in women who have not borne children, the disposition of the cervix is less regular, as I have stated, in multiparous women. Specimens of virgin uteri are also occasionally met with, in which the cervix presents a cribriform appearance, instead of having the transverse rugæ with fossæ between them; or there may be a less number of rugous columns than four, from the absence of some of the longitudinal sulci or ridges. When the follicles are disposed in a cribriform manner, they enter more deeply into the structure of the cervix, and are collected together in pouches instead of in furrows. (Fig. 2, plate vi.)

If we take a section of the cervix containing one of the longitudinal columns only, and magnify it nine diameters, we obtain a further insight into the glandular structure of this canal. The transverse ridges now stand out very prominently. Besides the primary rugæ, each fossa is subdivided by smaller rugæ from which curved septa, still more minute, take their origin, dividing the principal fossæ into a great number of crypts arranged like a piece of network. In each of the fossæ between the primary rugæ, as many as from forty to fifty crypts or lacunæ may be seen. A cervix of moderate size, magnified nine times, would show between the transverse rugæ of the four columns alone, from two to three thousand follicular pits. But besides the fossæ between the rugæ, the spaces between the rugous columns, and the longitudinal sulci themselves, are all seen to be covered by numerous follicles. Small plicæ are everywhere visible, and these are evidently only a repetition of the columnar rugæ, on a lesser scale. This is particularly the case with respect to the larger extremities of the transverse rugæ, all of which are closely studded with mucous pits. (Plate iv.)

If a portion of the cervix be magnified still further to the extent of eighteen diameters, so as to take only two or three of the primary ridges and fossæ into the field, it will be seen that the rugæ themselves, and even the secondary

septa, are covered in the greater part of their length with mucous follicles. The crypts in the furrows are still further divided and subdivided, so as to double or treble the number of follicles and lacunæ seen with the lower power. In a portion of the cervix, comprising only three rugæ and their two interspaces, upwards of 500 mucous follicles were easily counted, so that it is within the limits of moderation to say that a well-developed virgin cervix uteri must contain at least 10,000 mucous follicles. (Plate v.)

When a longitudinal section is made through one of the rugous columns, the fossæ are found to extend obliquely and deeply into the substance of the cervix, sometimes to the extent of the sixth of an inch, but occasionally mucous openings pass into the centre of the walls of the cervix, and may be seen filled with the tenacious mucus proper to the cervical canal. These irregular cavities are in some instances obstructed, and contain masses of inspissated mucus, the openings to the cervical mucous surface having become permanently closed.

Besides the arrangements already described, the superficial surface of this portion of the cervical canal is still further increased by the presence of villi similar to those found in the lower part of the cervix. These villi extend to the glandular surface of the canal, and are found in considerable numbers on the larger rugæ and other parts of the mucous membrane in this situation.

Thus the entire organisation and disposal of the mucous membrane lining the canal of the cervix uteri is such as to afford a very large extent of glandular surface for the purposes of secretion. In effect, the cervix uteri is an open gland; and in my opinion it is in this part of the utero-vaginal tract that the principal seat of leucorrhœa exists.

I may here refer to a point which should not be lost sight of, bearing as it does upon the pathology and treatment of leucorrhœal affections, namely, the great similarity which exists between the skin, and the mucous membrane of the vagina and the external portion of the os and cervix uteri. The resemblances of the mucous membrane in these situa-

tions are certainly much nearer to the cutaneous structures than to the mucous membranes of more internal parts. This is particularly the case with respect to the dense epithelial layer of the vagina and os uteri; and the villi of the os uteri are, perhaps, more nearly allied to the papillæ of the skin than to the villi of the intestinal mucous membrane. These analogies are strongly confirmed by what is observed of the pathological conditions to which these parts are liable, and by the effects of therapeutical applications. It is well known that when inversion of the vagina occurs, as in *procidentia uteri*, the secretion of mucus is arrested, and the epithelial layer of the vagina becomes hard and similar to epidermis.

The epithelium found upon the follicular surface of the canal of the cervix uteri is cylindrical or dentated, like the epithelium just within the os. It is also ciliated low down in the cervix, and this character is continued into the cavity of the fundus uteri. The villi found in this portion of the cervix are covered by the dentated epithelium, just as in the case of the villi of the lowest part of the cervix. Mixed with the epithelium of the follicular surface of the cervix, a considerable number of caudate corpuscles are frequently found, each of them having a distinct central nucleus.

Thus it appears that the epithelium of the os uteri and external portion of the cervix is constantly squamous; that the epithelium just within the os uteri is cylindrical but not ciliated; and that in the rugous portion of the cervical canal the cylindrical epithelium becomes ciliated. Various opinions have been held respecting the situation in which the squamous epithelium becomes changed for the cylindrical, and also respecting the point at which cilia are first found. The above is the result, however, of the examination of numerous uteri, made as early as possible after death, so as to anticipate the alteration of the cilia and epithelium by post-mortem changes.

The normal mucus secreted by the glandular portion of the cervix is extremely viscid and almost transparent. It adheres to the crypts and rugæ so as to fill the canal of the

cervix. It consists chiefly of mucous corpuscles, caudate corpuscles, minute oil globules, and occasionally dentated epithelium, all entangled in a thick tenacious plasma. The tenacity of the plasma is so great that the mucous corpuscles and epithelial debris are arranged in strings within the fluid, and even individual corpuscles may be elongated by pressure upon the plasma, under the microscope. (Fig. 2, plate III.) The mucus found at the lowest part of the canal of the cervix is thinner than that belonging to the glandular portion of the cervix, a circumstance which may perhaps be owing to the secretory action of the large number of villi within the margin of the os.

The mucus found in the upper part of the vagina, as the proper vaginal secretion, is no doubt chiefly secreted by the villi and epithelium of the upper extremity of the vagina and of the os uteri and external portion of the cervix.

The vaginal mucus, as first secreted, is pearly and semi-transparent, containing numerous curdy particles, which, when they accumulate to any considerable amount, give it a creamy appearance. Examined microscopically, the mucus of this situation possesses nearly the same characters as the mucus of the cervical canal, except that it contains, as already mentioned in a former part of the present Paper, larger quantities of squamous epithelium and epithelial debris. The only other essential difference is that the first is in the normal state invariably *acid*, while the second is always *alkaline*. It is to this chemical difference, and not to the preponderance of epithelium or mucous corpuscles, that we must look for the cause of the different outward appearances presented by vaginal and uterine mucus.

Mr. Whitehead, of Manchester, in his work on 'Abortion and Sterility,' made the observation that the mucus of the vagina always possesses acid qualities, and that the discharges from the interior of the uterus are as constantly alkaline. This point I have verified by numerous trials. In the ordinary state I find, moreover, that the secretion not only of the vagina but of the os and external surface of the cervix is acid, while it becomes alkaline within the labia uteri. If

a piece of litmus paper be applied to the surface of the os uteri, it is instantly reddened, but the blue colour is restored by passing it within the cervix. The margin of the cervical canal, and the limits of the villi covered by squamous epithelium, and the commencement of the villi covered by dentated epithelium, seem to mark the division between the acid and alkaline secretion. It is to the alkali that the secretion within the cervix owes its viscosity and transparency, while the curdled appearance of the vaginal mucus is owing to the presence of the vaginal acid. The acid of the vagina is quite sufficient to more than neutralise a moderate quantity of the alkaline secretion of the cervix, and when any secretion from the cervical canal enters the vagina, it becomes curdled from the coagulation of its albumen. The same thing may be imitated out of the body. On the addition of a little weak acetic acid, the thick viscid mucus of the cervix becomes after a time changed into the curdy mucus of the vagina. This fact is important; for in common with many other writers, Mr. Whitehead thinks a profuse secretion of the uterine mucus "extremely rare," whereas, it is remarkably common in leucorrhœa; but the fact has been masked by the circumstance of its becoming altered when it descends into the vagina, so as to resemble the strictly vaginal mucus; and its source has thus been attributed to the vagina instead of to the cervix uteri. Mr. Whitehead is of opinion that the acid mucus of the vagina is intended to prevent the coagulation of the catamenial fluid in this canal; but I believe that in addition to this, the different chemical conditions of the surface of the os uteri, and of the canal of the cervix, play an important part in the pathology of these structures. During the catamenial flow, the acid vaginal mucus probably has the effect attributed to it by Mr. Whitehead, that of preserving the fluidity of the catamenial discharge, a small quantity of this mucus having the effect of preventing its coagulation even out of the body. The immediate effect of the acid mucus upon the secretion of the cervix uteri, is to cause its coagulation in the way already pointed out.

The ordinary use of the acid vaginal mucus seems to be

the lubrication of the surfaces of the vagina, and the external surfaces of the os and cervix uteri. In the normal state only a sufficient amount of mucus for this purpose is secreted, there being little or no discharge issuing from the ostium vaginæ. It will not escape observation that the portion of the mucous membrane of the uterus and vagina which resembles the skin, is the only part which, like the skin, furnishes an acid secretion.

The uterine cervical mucus has other uses to perform, besides the lubrication of the membrane by which it is secreted. When the cervix uteri is found perfectly healthy, little or no discharge is seen issuing from the cervical cavity, but when the labia uteri are separated; the canal of the cervix appears to be full of its peculiar secretion. In examinations after death, in cases in which the uterine organs are in a healthy condition, the mucous crypts and the canal of the cervix are found filled with viscid mucus, so as to entirely block up the passage from the vagina to the cavity of the fundus. This appears to be the normal condition of the cervical canal. At each catamenial period, the whole of the tenacious plug of mucus must be washed away by the menstrual fluid, as the latter may be seen escaping freely from the os uteri at these times. But in a few days after the completion of the period, the mucous plug is again formed. Thus it would seem to be the function of the glandular structure of the cervix, in the unimpregnated state, to secrete each month a sufficient quantity of viscid mucus to fill the channel of the cervix; the mucous follicles becoming comparatively inactive when this has been accomplished, until after its removal at the next flow of the catamenia. In healthy subjects, the canal of the cervix is always full in the intervals between the menstrual periods, though there certainly seems nothing like a constant flow of the cervical mucus into the vagina.

The use of the cervical mucus is probably two-fold. In the first place it closes the cervix uteri and defends the cavity of the fundus from external agencies as completely as though it were a shut sac. In the second, it probably affords

a suitable medium for the passage of the spermatozoa into the uterine cavity.

The last number of the 'Cyclopædia of Anatomy and Physiology' contains an article on the *Vesiculæ Seminales*, by Mr. Pittard, in which he suggests the hypothesis "that the office of the *vesiculæ* is to secrete and keep in store a mucus of such a nature as is congenial to spermatozoa." Now, the secretion of the *vesiculæ seminales*, like the secretion of the *cervix uteri*, is viscid, transparent, and alkaline. The spermatozoa are deposited at the *os uteri*, and there can be no doubt that where impregnation takes place some days after the completion of menstruation, the spermatozoa have to make their way through the plug of mucus filling the cervical canal, and it is a plain inference that this mucus must be adapted for their ascent to the cavity of the *fundus uteri*. In this progress, the movement of the spermatozoa themselves and the action of the cilia of the cervical canal no doubt contribute.

In pregnancy, the whole of the transverse rugæ and the follicular structures of the *cervix* are considerably enlarged, and a thick plug of viscid mucus is secreted in the early part of pregnancy, which continues to seal the *os uteri* during the whole of gestation, until it is removed at the beginning of labour. Sir Charles Clarke was of opinion that the cervical mucus was not secreted at any other time than during pregnancy, but this is clearly a misapprehension. In many cases there is, throughout pregnancy, a very considerable excess of the cervical secretion, which may occur at this time without any marked local or general derangement, while in other cases, the filling up of the cervical channel seems to be the measure of the healthy activity of the glandular surface, there being little or no discharge of mucus from the *cervix* into the vagina during the period of gestation. The profuse secretion of mucus, which lubricates the *os uteri* and the vagina, during parturition, is probably derived, not from the vagina, but from the follicles of the *cervix uteri*.

Objections may possibly be raised to some of the anatomical and physiological points which have been brought

forward in the present Paper, and it must be evident that much still remains for investigation, but I trust enough has been established to furnish the foundation for a new pathology of leucorrhœa. This was impossible without a microscopical examination of the tissues concerned. It would be easy to fill a volume with the discordant accounts which, in the absence of a knowledge of the minute anatomy of the parts involved, have been given of the nature and sources of leucorrhœal discharges.

One justly celebrated treatise was, it is well known, founded upon a classification of these discharges, the classification being made to depend upon mere outward and sensible qualities. I venture to submit, that no writer has hitherto formed anything like a just appreciation of the parts borne by the vagina and the os and cervix uteri respectively, in their production. Effects have been mistaken for causes; and secondary phenomena have received the importance due to those which are primary; while in treatment the most important structures have escaped attention altogether.

From a consideration of the structure of the different parts of the utero-vaginal mucous membrane, and the facts connected with leucorrhœa, it is impossible to do otherwise than form the conclusion, that the glandular portion of the cervix uteri is the chief source of the discharge in the most common form of this malady. This has often been suspected to be the case to a great extent; but it could not be asserted as a positive doctrine until the minute examination of the glandular structure of the cervical canal had been made, nor until the proof of the absence of any other follicular or secreting surface adequate to the pouring out of a profuse leucorrhœal discharge, had been obtained.

Leucorrhœa, in its most simple and uncomplicated form, is, then, the result of a morbid activity of the glandular portion of the cervix. \* A follicular organ, which should only take on an active condition at certain intervals, becomes, from a variety of causes, constantly engaged in secretion. Instead of the discharge of the plug of mucus at the catamenial period, an incessant discharge is set up. In

the first instance, the leucorrhœal discharge consists of nothing more than an unusual quantity of the elements found in the healthy mucus of the cervix. Quantities of mucous corpuscles and oily particles, with particles of epithelium entangled in the viscid alkaline plasma, which gives the mucus its clearness and consistence, are found. The mucus is seen at the os uteri, extending, in the form of a string, through the vagina to the os externum, and also adhering to the walls of the vagina in the curdy or creamy state, produced by the vaginal acid. This form of leucorrhœa is to the cervix uteri what menorrhagia is to the cavity of the fundus uteri. (Figs. 2, 3, plate VI.)

The quantity secreted daily is sufficient, in severe and continued cases, to prove a serious drain to the constitution; and the glandular cervix becomes, in some instances, so excitable, that any unusual stimulus provokes a sudden flow of mucus. The relation of mental emotion to the cervical follicles becomes almost as intimate as the connection between the mind and the lachrymal glands. Any sudden mental disturbance is, in such cases, followed by a sudden secretion and discharge of mucus into the vagina.

In some cases of leucorrhœa there is no discharge from the cervix uteri, and little or no implication of the glandular cervix; but the external surface of the os uteri and the upper part of the vagina secrete a copious discharge. When the surface remains unbroken, or the mucous membrane is only denuded of epithelium, the secretion consists of a plasma, containing multitudes of scaly epithelial particles in every stage of formation, from mere nuclei to the detritus of old epithelium. This may be called Epithelial Leucorrhœa of the vagina, as distinguished from the Mucous or Corpuscular Leucorrhœa of the cervical canal. This distinction is of use in practice, because it is in the epithelial form of leucorrhœa that astringent injections are most useful. When the morbid condition of the vagina extends deeper than the epithelium, the discharge is found to contain pus or mucous corpuscles in abundance, and it can hardly be distinguished by the microscope alone from the cervical form of leucorrhœa. (Fig. 2, plate VII.)

As regards the pathological condition of the mucous membrane of the os uteri and external portion of the cervix in chronic leucorrhœa, I may state that I have, with the aid of Dr. Hassall, examined microscopically many cases after death, in which abrasion or superficial ulceration, as it is termed, has existed; and the following is an abstract of the results.

The epithelium of the external portion of the os and cervix uteri and of the upper portion of the vagina may be partially or entirely removed; or there may be morbid patches in which the epithelium is here and there wanting. When, in analogous states, the epithelium has been removed in the living subject by diseased conditions, the mucous surface is of an intensely red colour from the presence of the naked villi with their vascular loops, and it conveys an impression of roughness and denudation upon examination by the speculum. To the touch the abraded surface feels erectile and "velvety," a term which has been very commonly applied to what has been considered ulceration of the cervix and os uteri. The villi do, indeed, in this condition stand out somewhat like the pile of velvet, and in some cases the villi themselves are considerably enlarged.

In other cases there is not merely loss of the dense epithelium, but the villi, both of the external surface of the os uteri and of the mucous surface within the labia uteri, are destroyed in patches. In that condition of the os uteri which, upon examination after death, would be pronounced to be undoubted superficial ulceration, the state which generally obtains is partial or entire loss of the epithelial layer in circumscribed patches, and here and there the loss or partial destruction of the villi. This gives an eaten, corroded appearance to the mucous surface. Such a condition of the os may be limited in extent, or it may be spread over the whole of the os and external cervix, and pass within the labia uteri. Sometimes small circumscribed ulcers are seen, in which the denuded, or partially denuded, villi are found surrounding the edge of the small ulcer, the area of the ulcer itself being bare of villi, or the ragged debris of villi and their vascular loops appearing at the bottom of the

ulcer. These little ulcers appear commonly in eruptive disorders of the os uteri; but they represent perfectly the loss of epithelium and villi, and to a more complete extent than is found in diffused patches of diseased surface. (Fig. 1, plate VII.)

In one case which I examined after death, not only the villi, but portions of the lower rugæ in the glandular portion of the cervix were eaten away.

The causes which produce these pathological conditions are various. They may arise from vaginitis; from mechanical injury, as in parturition; or from inflammatory states of the os uteri, having an independent type, though I think this is of comparatively rare occurrence; or, and which is more frequently the case, they may be caused by eruptive disorders of the mucous membrane, similar to herpes and eczema in the skin. The os uteri is frequently covered by small vesicles, which can hardly be distinguished from herpes or eczema. These eruptive conditions strongly mark the analogies between this tract of mucous surface and the skin. I have observed cases in which an occasional herpetic eruption upon the os uteri always produced herpes præputialis in the husband, showing very clearly the herpetic nature of the disorder. But by far the most common mode in which loss of epithelium takes place, is, I believe, as a secondary result of chronic irritation of, and discharge from, the glandular surface of the cervix. In my experience, it has been rare to find a morbid state of the os uteri, without the exudation of a gummy albuminous discharge from the canal of the cervix. In the case of wax models of the so-called ulceration of the os uteri, submitted to the Society on a former occasion by Dr. Murphy, I observed that in nearly all of them the artist had correctly represented the viscid cervical mucus as issuing from the os uteri. When the discharge from the cervix uteri coexists with lesion of the os uteri, it appears to me that the *alkaline* discharge lying upon the surface of the os and external portion of the cervix, irritates these surfaces, accustomed to the presence of an *acid* secretion, and occasions the rapid shedding and loss

of the epithelium, and ultimately the injury or destruction of the villi beneath. I believe this to be the true pathology of the greater part of what has been called inflammatory ulceration of the os and cervix uteri.

The loss of portions of the epithelium is so common in cases of confirmed leucorrhœa, that there must be some frequent and common cause which produces it; and it appears to me that it is more reasonably accounted for in this way than in any other. We know that the mucous surfaces, accustomed to acid secretions, are irritated by the continued presence of alkaline states, as, for instance, the stomach under the constant use of alkalies, the bladder in the secretion and retention of alkaline urine, or the urethra in spermatorrhœa. Many other facts might be urged to show that the diseased states of the os uteri in leucorrhœa are secondary to the morbid condition of the cervical canal.

The secondary character of the so-called ulcerations of the os uteri, and their dependence upon uterine catarrh, has been suspected by several writers upon uterine disease. But in the absence of a definite knowledge of the structure of the parts concerned, it was objected that uterine catarrh is not invariably accompanied by lesion of the os uteri, and that ulceration might exist without any catarrhal flux from the uterus. These reasons, advanced by Duparcque, were thought so valid and unanswerable by Dr. Evory Kennedy, that he relinquished the idea as preposterous. But I submit, that if the excessive cervical secretion be a general cause of abrasion of the os uteri, it would not be extraordinary to meet with some case in which, notwithstanding the leucorrhœal flow, the epithelium remained healthy, from the existence of greater thickness or vitality, or from the un-irritant nature of the discharge, in a certain proportion of cases. I have carefully observed a large number of cases, and although I have sometimes found cervical leucorrhœa without any marked derangement of the os uteri, I have very rarely found the os uteri abraded without the existence of disease of the glandular portion of the cervix, unless in cases of eruptive disease. I have also found in treatment, that the

best way to restore the os uteri is by restraining the cervical secretion; but that the morbid state of the os uteri may be remedied again and again, with a tolerable certainty of the recurrence of the disorder, unless the cervical secretion be brought back to the healthy condition.

When the changes of structure above described have taken place in the os and external surface of the cervix, the nature of the leucorrhœal secretion is, as I have already observed, materially altered. The morbid os and cervix now secrete mucus and pus in abundance, blood globules escape from the vessels, and large quantities of scaly epithelium in every form, from mere nuclei to the perfect scales and epithelial detritus, become mixed with the secretions of the cervical glandular structure. But one circumstance is somewhat remarkable. As the epithelium of the cervical canal is cylindrical, it might have been expected that cylindrical epithelium would constantly be found in the discharge issuing from the cervix. Yet the presence of the debris of cylinder epithelium in this discharge is comparatively rare. More than this, scaly epithelium is frequently found mixed with the viscid secretion coming from the canal of the cervix. I have frequently drawn out a string of mucus from the cervix with a long forceps, and it has almost invariably contained scaly epithelium. Whether this arises from the difficulty of obtaining any of the cervical secretion perfectly pure or not, or whether the cervix uteri has the power of imbibing particles of scaly epithelium from the os, I am not prepared to say, but the fact is as I have stated it. (Fig. 2, plate VI.)

I should fear to weary the Society by detailing the numerous microscopical examinations of leucorrhœal discharges kindly made for me by Dr. Handfield Jones and Dr. Hassall, in cases of every intensity and complication. The above are the results of these microscopical analyses. The chemical condition of the discharges has varied with the amount of cervical secretion, blood and pus globules, and vaginal mucus. Every care was taken always to exclude extraneous matter, the portions kept for examination being

always taken up by a pair of long forceps, and preserved in glass tubes.

The pathological results of the preceding investigation may be stated as follows:—If any division of leucorrhœa be attempted, we must recognise two principal forms of this disorder. Of these, the first and by far the most frequent is the *mucous* variety, consisting chiefly of mucous corpuscles, and secreted by the follicular canal of the cervix. The second is the *epithelial* variety, in which the discharge is vaginal, or is secreted by the external surface of the os and cervix, and consists for the most part of scaly epithelial debris. These two varieties may of course exist in various degrees of combination. As regards the morbid changes occurring upon the os and cervix uteri (the so-called ulcerations) two grades of alteration are found; one of which, and by far the most common, may be called *epithelial abrasion*. In this, the epithelium is the only structure deficient. In the second grade, the villi, and occasionally the base from which they spring, are affected by a superficial ulcerative process, which may be designated as *villous abrasion*, *erosion*, or *ulceration*.

I have already referred to the occurrence of eruptions upon the os uteri, a circumstance which has often been observed by uterine pathologists. But there is one state of the os and cervix uteri which is deserving of particular attention, namely, that in which the so-called ovules of Naboth occur.<sup>1</sup> The vesicles which have received these absurd designations are generally considered to be obstructed

<sup>1</sup> The first volume of the 'Mémoires de la Société de Chirurgie de Paris,' 1847, contains a Paper by M. Huguier, entitled 'Mémoire sur les Kystes Folliculaires du Vagin,' in which the ovula Nabothi and their transformations are elaborately described. M. Huguier considers them to be obstructed mucous follicles of the cervix uteri; but it is not a little singular that, in the figured representations of these cysts, they appear to extend far beyond the limits of the cervical follicles; and in one instance the cavity of the cervix, the muscular walls of the uterus, and the broad ligaments, are all studded with vesicles or cysts, presenting apparently the same character. This subject is certainly one requiring further investigation.

mucous follicles, but they are often found in situations where mucous follicles cannot be detected; and after a careful examination of several of these cases, they appear to be rather a form of vesicular disease, having its first seat in the deeper structures of the mucous membrane. This affection is generally attended by profuse discharge from the cervix, with a patulous and engorged state of the os uteri. These vesicles are found in the upper part of the vagina, upon the os uteri and external portion of the cervix, within the os, and upon the penniform rugæ, as high up as the summit of the rugous columns. The vesicles mature and rupture one after another, leaving ulcerated spots, which may either heal or spread over the mucous surface. They reach their greatest size at the os uteri. Sometimes they enlarge without discharging their contents, and I suspect it is in this way that vesicular polypi of the os and cervix uteri are formed. I may mention, that Dr. Hassall suggests, that the solid polypi found attached to the cervix take their rise in enlarged villi of the cervix uteri.

The covering of these transparent vesicles is a thin fibrous membrane. Their contents are a white pearly coagulated matter, in which numerous granular corpuscles, mucous corpuscles, and minute points of oily matter are found.<sup>1</sup> (Fig. 1, plate VIII.)

In the middle of the walls of the cervix, what appears to be undoubtedly obstructed mucous follicles are sometimes seen. But the appearance and contents of these are very

<sup>1</sup> M. Robin has published in the 'Archives Générales de Médecine,' tome xvii, xviii, 1848, a 'Mémoire pour servir à l'Histoire Anatomique et Pathologique de la Membrane Muqueuse Uterine, de son mucus, de la caduque, et des œufs ou mieux glands de Naboth.' The greater part of the very able memoir of M. Robin is occupied by a minute description of the state of the mucous membrane during pregnancy; but he is, like other writers, of opinion that the ovula Nabothi are nothing more than obstructed Nabothian glands, meaning by the latter the whole of the mucous follicles of the cervix uteri. He considers the mucus secreted by the glands of the cervix identical with the contents of the ovula Nabothi; he is so convinced of this, that he describes the latter, but thinks it unnecessary to describe the former.

different from the Nabothian bodies. They have the appearance and consistence of curd, and under the microscope contain myriads of mucous corpuscles, with abundance of single fat globules, and occasionally large agglomerations of oily matter. (Fig. 2, plate VIII.)

There is another state of the os and cervix uteri in leucorrhœa of considerable importance, but which has hitherto, as far as I am aware, escaped attention. In long-continued irritation of the canal of the cervix, partial inversion of the lower part of the cervical canal may take place, causing increased pain and distress, and an aggravation of the leucorrhœal symptoms. The lower part of the canal of the cervix is frequently so inverted that it comes into contact with the vagina, and the penniform rugæ may be sometimes seen upon examination. (Plate IX.)

When the os uteri is open, and the cervix partially everted, so as to bring the penniform rugæ into view, an appearance is produced which has been considered a form of ulceration, called the "cock's comb" granulation; the serrated edges of the so-called ulcer being, in reality, the penniform rugæ presenting at the os uteri, denuded of epithelium, and with the villi florid and enlarged. The villous surface of the partially inverted cervix very much resembles the granulations of an ulcer to the naked eye, and has, no doubt, been frequently mistaken for them.

The simply open state of the os uteri, generally found in leucorrhœa, appears to me to depend, not upon muscular dilatation, as commonly supposed, but upon a development of the os and cervix caused by local irritation, and to be somewhat similar to the development of these parts in the early months of gestation.

It remains to make a few remarks on the practical deductions which may be drawn from the present investigation. The demonstration of the extensive glandular structure existing within the os uteri, at once points to the influence of constitutional causes in the production of leucorrhœa, and shows the true reason why this affection should be so common in women of strumous habit and leuco-phlegmatic

temperament. It also explains the effect of the excessive glandular secretion upon the constitution; and, above all, it vindicates the importance of constitutional treatment in this malady. It further directs attention to the more rational application of topical remedies. If, as I believe, the morbid conditions of the os uteri either depend in most cases upon eruptive disorders, having their cause in the condition of the constitution, or are secondary to the morbid flow of alkaline mucus from the cervical canal, it is evident that the profuse application of caustics, as recommended in the French school of uterine pathology, is unnecessary and unscientific. We ought not to use these measures in eruptive conditions of the os uteri, any more than we should use them in similar diseases affecting the skin. Nor should we use them in cases of secondary abrasion, from the irritation of the cervical discharge, as we should only be dealing with an effect, while the cause of mischief remained. This would leave comparatively few cases for their application. I admit that leucorrhœa of the cervical canal is sometimes cured by the use of caustics to the os uteri, but, in these cases, they seem to act as counter-irritants to the glandular structure, and thus to effect a cure indirectly. I believe I have seen cases cured by blistering the cervix with acetum cantharidis more readily than by caustic, and on the same principle. It is of little use to direct attention to the os uteri if the interior of the cervix be neglected. Any abrasion or other lesion of the os uteri may be relieved by topical treatment; but if the cervical discharge continue, the os uteri is seen to renew its morbid state again and again.

The indications of treatment which I have proved to a considerable extent in practice, arising from the minute anatomy of the knowledge of the os and cervix uteri, and the study of its pathology in leucorrhœa, appear to me to be the combination of constitutional medicines and regimen, with local applications. But it is obvious that, in the majority of cases, local measures, to be of use, must be applied, not to the vagina nor the os uteri, but to the canal of the cervix. With respect to the common method of treatment by injec-

tions, these are of great service in vaginal or epithelial leucorrhœa, where the walls of the vagina and the external surface of the os and cervix uteri are the seat of disorder; but in cervical or mucous leucorrhœa, little good is obtained unless some portion of the injection is passed into the cervix. As the os uteri is frequently patulous to some extent, this may occur in their common use, but only to a limited extent. To make the entrance of injections into the cervical cavity more certain, I generally recommend the injection of plain water, in the first instance, to clear away the mucous plug from the os uteri, and then the use of medicinal injection. Or, as nearly all the injections used in leucorrhœa coagulate the cervical mucus, and diminish the size of the cervical plug, I direct a first injection to be used with this view, to be followed, in a short time, by a second quantity of injection, to act upon the mucous membrane of the os uteri and cervical canal. It is singular that, almost without exception, the substances used for injections in leucorrhœa have an acid reaction. In intractable cases I apply astringent solutions, such as a concentrated solution of tannin, or a solution of the nitrate of silver, or a solution of iodine, applying them directly to the canal of the cervix by a camel-hair pencil. But I am at present engaged in the attempt to determine the best methods of local and general treatment.

I will not further trespass on the Society, except to state that that which I have now submitted, with much deference to the consideration of the Fellows, is but the commencement of an extensive field of investigation, the prosecution of which may, I trust, prove serviceable, by rendering a troublesome class of maladies more intelligible than they have hitherto been, by correcting errors of practice, and by indicating the just value and kinds of constitutional and topical remedies.

The drawings which accompany the present Paper were executed by Mr. Miller, under the careful superintendence of Dr. Hassall. In all, which are above the size of nature, the camera lucida was employed, to ensure fidelity.





Extremities of Villi of Uteri covered by Squamous Epithelium  
showing their central depressions

22 $\mu$  diam

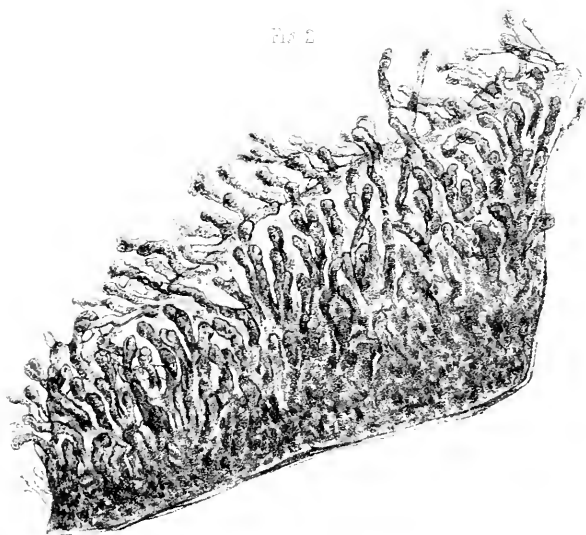
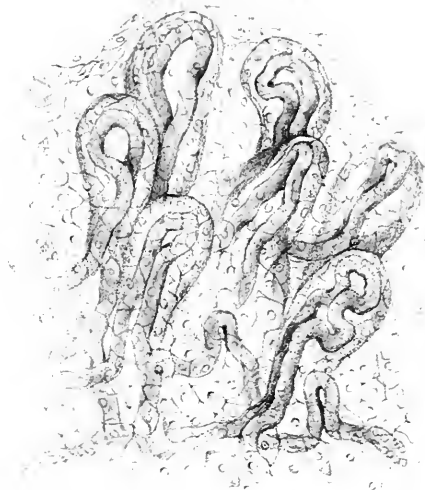


Fig 2

Section of uterus, from which the above has been prepared  
from preparation of Haggard

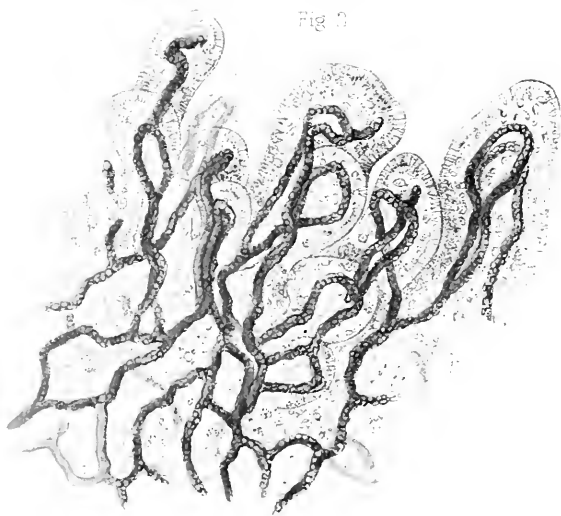
24 $\mu$  diam



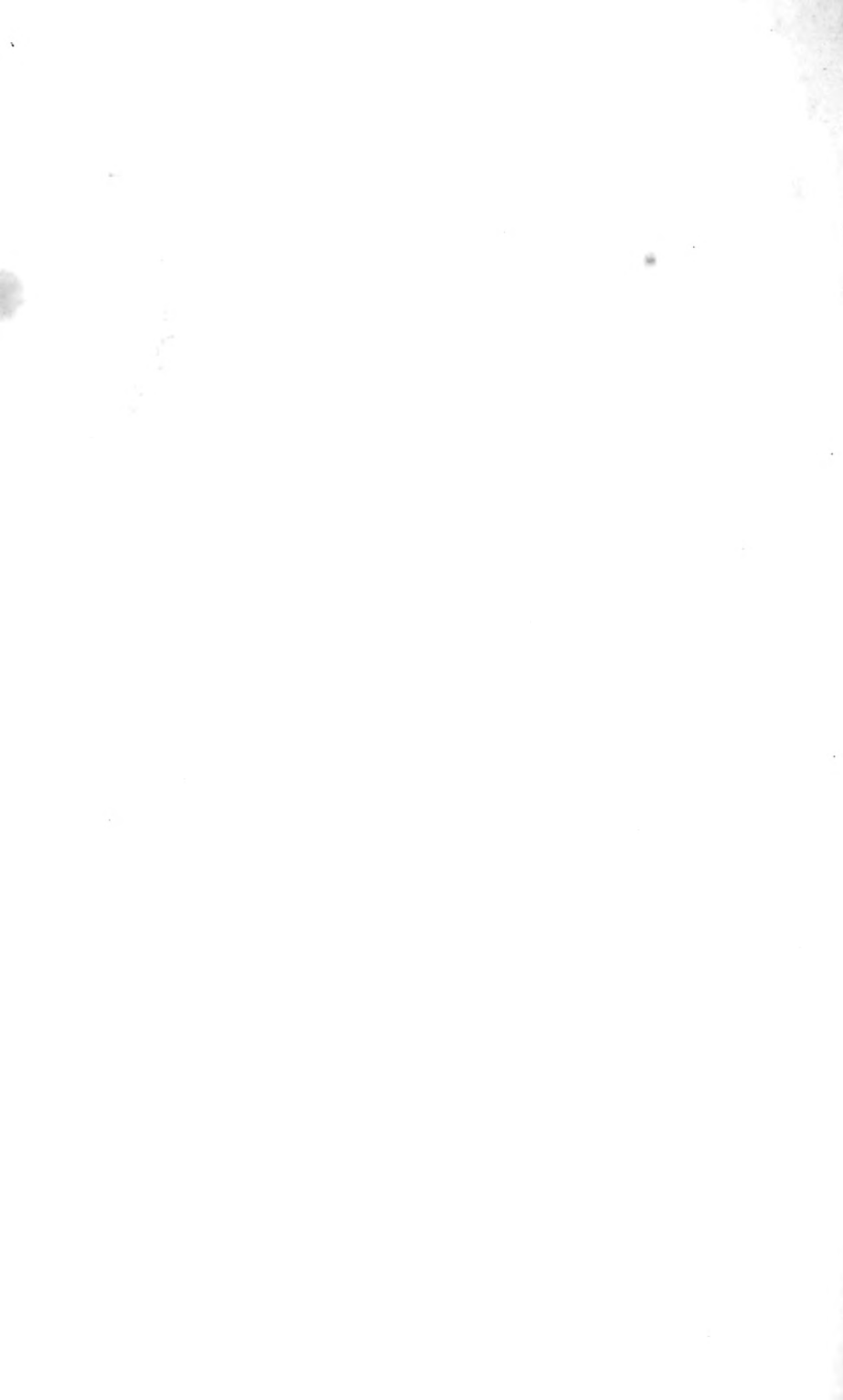


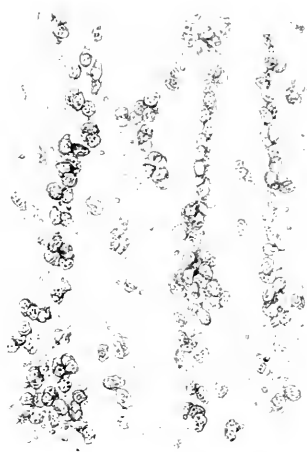
Wall of Os Uteri, covered by pavement Epithelium  
& containing looped Blood vessels  
200 diam.

Fig. 3



Wall of Os Uteri covered by cylindrical Epithelium,  
& containing looped Blood vessels &c  
100 diam.





Mucus discharge from the healthy Cervix Uteri, taken from the Mucus crypts, the Mucus Corpuscles are arranged in strings by the Viscosity of the Plasma in which they are entangled.  
220 diam

Fig. 1.



Fig. 2. Mucus discharge from the healthy Cervix Uteri, taken from the Mucus crypts, the Mucus Corpuscles are arranged in strings by the Viscosity of the Plasma in which they are entangled, with the thin plasma of the Mucus discharge.  
220 diam





Fig. 1. Liver of a human in the Virgin Mary  
from preparation of Dr. Hucail.

Pl. IV.



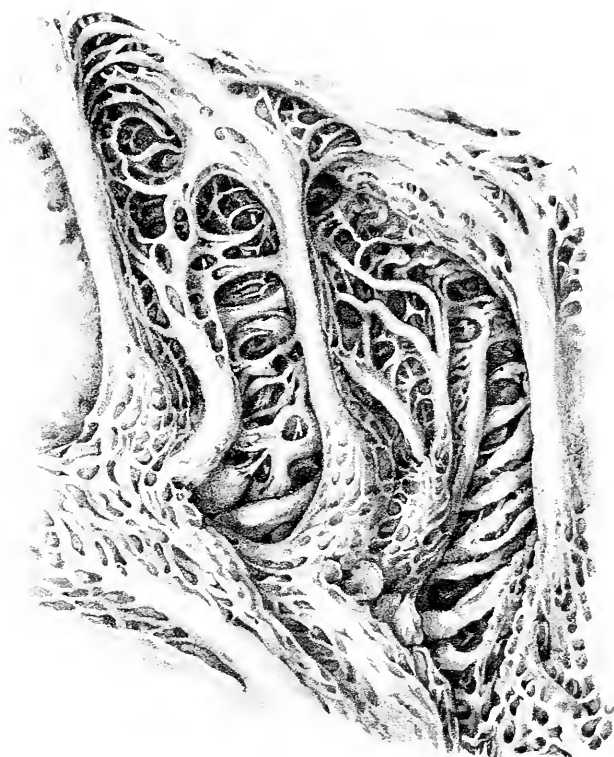


Fig. 1. The Jugular and its tributaries of the Cervix.

1840.



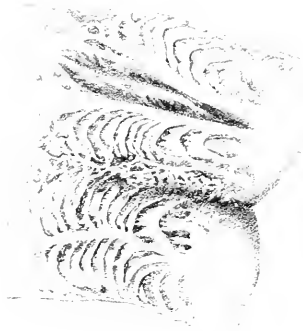


Figure of *Trachypogon*  
Nucula

Figure of *Trachypogon*  
Nucula



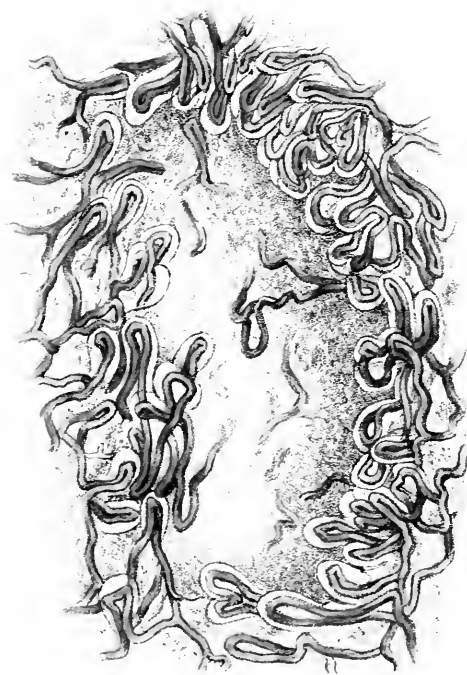
Fig. 3



Ependyma, from the inner layer of the brain.

0.25 diam.

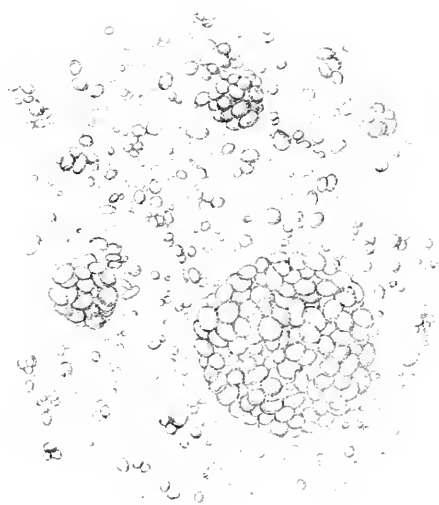
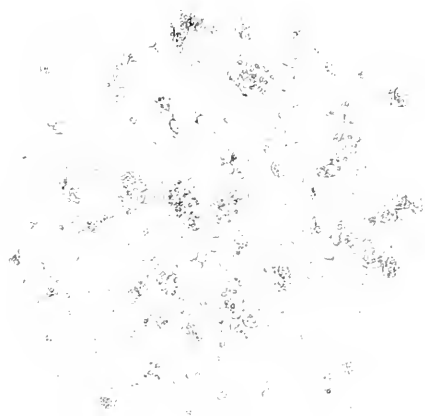
Fig. 4



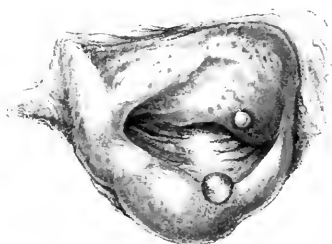
Ependyma, from the inner layer of the brain, showing the Ependyma and the inner layer of the brain, showing a fringe of enlarged Vili.

0.25 diam.









10. and Cervix. (11. partially inverted and shewing the  
Fimbriae and Nabothian Cyst.  
Natural Size



ON THE  
PROTECTION AGAINST SMALLPOX  
AFFORDED BY  
VACCINATION,

ILLUSTRATED BY THE RETURNS OF THE ARMY, THE NAVY,  
AND THE ROYAL MILITARY ASYLUM.

BY  
T. GRAHAM BALFOUR, M.D.,  
SURGEON TO THE ROYAL MILITARY ASYLUM, CHELSEA.

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Received April 26th.—Read June 8th, 1852.

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THE national importance of this question will, it is hoped, prove a sufficient apology for laying before the Society the following statistical evidence on the subject.

One of the principal difficulties in the investigation arises from the impossibility of ascertaining what proportion of the general population is unprotected by vaccination, or by a previous attack of smallpox. Our deductions have therefore been founded chiefly on the returns of the Army, the Navy, and the Royal Military Asylum, which contain the requisite information on that head.

I. THE ARMY.

There are no returns which show the actual number of soldiers who have been vaccinated or had smallpox, but a tolerably accurate approximation may be obtained in the following manner:

From returns forwarded annually to the Army Medical Board, it appears that, in the eight years from the 1st of April, 1844, to the 31st of March, 1851, inclusive, out of

90,092 recruits medically inspected at the head-quarters of recruiting districts, and found fit for service, 20,132 bore marks of smallpox; 64,096 had marks of vaccination; and 5864 bore no distinct traces of either. By the rules of the service, the last class would undergo vaccination immediately on joining their regiments, and consequently must be added to the number protected by vaccination; making a total of 69,960, or 78 per cent. of the whole, while 22 per cent. had previously been protected by smallpox. These proportions having been ascertained from such extensive data, may fairly be held to represent the condition of the army as regards protection from this disease.

The question now arises, what has been the number of admissions into hospital and deaths by smallpox among a body of men thus protected? In Abstract No. I, of Appendix, this information will be found, as regards the troops at home for a period of ten years, and in the colonies, of thirty years.

The following summary gives a condensed view of the results:

Among Troops serving in	Aggregate Strength.	Cases of Smallpox.	Deaths by Smallpox.	Annual ratio per 1000 of strength.	
				Cases.	Deaths.
The United Kingdom .	254,597	557	56	2·188	·220
Temperate Colonies . .	557,112	160	29	·287	·052
Tropical Colonies . .	314,131	28	8	·089	·025
Total . .	1,125,840	745	93	·662	·083

This Table shows the proportion of cases to have been only 66 and the deaths 8 in every 100,000 men serving throughout the army. But the prevalence and mortality have varied in different portions of the force. Thus, the deaths have been four times as numerous among troops in the United Kingdom as in temperate colonies, and eight times as numerous as in tropical colonies; while a still greater disproportion is found to exist in the admissions into hospital.

The comparatively large amount of smallpox among

troops at home is, doubtless, attributable to the men being chiefly quartered in the large towns from which it is scarcely ever absent, and also to the number of recruits who join their regiments after having been living in those densely peopled localities where they were most likely to be exposed to the contagion of that disease. This view is corroborated by the fact, that of the 56 deaths noted in the preceding Table, 9 occurred in London, 7 in Dublin, 6 in Glasgow, 5 in Cork, 3 in Manchester, and 2 each in Hull, Devonport, Bradford, Belfast, Newry, and Kilkenny, leaving only 14 for all the rest of the kingdom. Additional proof is afforded by the relative proportion occurring among young soldiers, to which we shall hereafter advert. Even taking the most unfavorable results, however, the mortality has only amounted to 2 in 10,000 of the force annually.

As the lower ratio of cases in the colonies may perhaps be attributed to the men being less frequently exposed to the contagion of the disease, it may not be out of place here to notice a few of the more striking instances in which, from the general prevalence of smallpox in the colony, they must have been so exposed. This is shown for the West Indies in the following Table :

—	Black Troops.			White Troops.			Ratio per 1000 of mean strength.			
	Mean Strength.	Admitted into Hospital for Smallpox.	Died.	Mean Strength.	Admitted into Hospital for Smallpox.	Died.	Cases of Smallpox.		Deaths.	
							Black Troops.	White Troops.	Black Troops.	White Troops.
Trinidad, 1819	603	Not stated,	58	230	Not stated,	0	Not stated,	Not stated,	96·2	0
St. Lucia, 1819	613	ditto	33	131	ditto	0	ditto	ditto	53·8	0
Bahamas, 1829	751	65	12	19	0	0	86·5	0	16·	0

Thus, while smallpox in one instance literally decimated the black troops, not a single death occurred among the European soldiers quartered in the same garrison.

In Malta, smallpox prevailed as an epidemic from March 1830 till August 1831, and again in 1838. The mortality caused by it among the military and civil population, respectively, was as follows :

		Strength.	Deaths from Smallpox.	Annual ratio of Deaths per 1000 of strength.
March, 1830, to } 18 { Civil Population		101,962	1169	7·6 <sup>1</sup>
August, 1831 } months { Military . . .		2299	2	0·6 <sup>1</sup>
April, 1838, to } 12 { Civil Population		105,456	686	6·5
March, 1839 } months { Military . . .		2156	0	0·

While, therefore, the loss by smallpox among the civil population has, on the average of these two epidemics, amounted to 718 in 100,000, among the Military, who, as we have already shown, are a protected class, it has only been in the proportion of 35 out of the same numbers.

In Ceylon 7874 cases and 2945 deaths by smallpox were recorded in 1819, in a population of about a million. In the same year only four cases, of which two proved fatal, occurred among 2863 European soldiers, being in the ratio of 1·58 admissions and 0·8 deaths per 1000 of the strength. Among the native troops, (chiefly Malays, Africans, and natives of the Peninsula of India,) a large proportion of whom were, owing to religious prejudices, unprotected by vaccination, 41 deaths occurred in a force of 4081, being 9·8 per 1000 of the strength.

The principal mortality by smallpox among the troops serving abroad was in Canada, where 23 of the deaths recorded in the preceding Table occurred. During the last ten years of the period over which the returns extend, almost all the cases were in Quebec, Montreal, and Kingston, where the disease prevailed to a very great extent among the civil population. Omitting this Command, the cases in the temperate colonies amounted only to 16; and the deaths to 1·5 in every 100,000 men.

If the hypothesis be correct, that the protective power of vaccination becomes gradually weaker and at length dies out, we should naturally expect to find the mortality by smallpox greater among the old soldiers. With a view to

<sup>1</sup> As the period included in this observation is a year and a half, it is of course necessary, in calculating the *annual* ratio of mortality, either to add one half to the strength, or to deduct one third from the deaths.

test this, we have traced the ages of the fatal cases occurring in the United Kingdom, and have also ascertained the numbers living at each age during the ten years, 1837—46, as follows :

	Aggregate Strength at each age.	Died by Smallpox.	Ratio of Deaths per 1000 of strength.
Under 20 .	43,833	15	·342
20 and under 25 .	90,041	28	·311
25 „ 30 .	49,285	3	·061
30 „ 35 .	37,151	8	·2
35 „ 40 .	25,017	1	·0
40 and upwards .	9,270	—	—
Not known .	—	1	—
	254,597	56	·220

Although, probably owing to the limited numbers, there is an irregularity in the progression, the general tendency to diminish with advancing age is very strongly marked.

The fact, established by the recruiting returns, that 6½ per cent. of the recruits are wholly unprotected, affords a melancholy proof of the neglect of vaccination among the lower orders in this country, especially as it may also be inferred that of the 22 per cent. who have distinct marks of having had smallpox, a very inconsiderable proportion could have been protected by previous vaccination.

## II. THE NAVY.

We have no means of ascertaining the relative proportions of men bearing marks of vaccination and of previous smallpox in this force ; but as it is a standing order that all men and boys entering the service who have not satisfactory marks of either, shall be immediately vaccinated, we may look upon them as a completely protected class. In Abstract No. II of Appendix will be found a detailed statement of the number of cases of smallpox in each of the Naval Commands, and of which the following is a summary :

	Aggregate Strength.	Cases of Smallpox.	Deaths by Smallpox.	Annual ratio per 1000 of strength.	
				Cases.	Deaths.
Home and "various" Force Foreign Commands . .	77,733	105	3	1·351	·038
	255,637	312	33	1·093	·115
	363,370	417	36	1·148	·099

Thus, it appears that throughout the navy the cases of smallpox have averaged only 115 and the deaths 10 in every 100,000 men.

Considering the manner in which sailors are necessarily crowded on shipboard, and the consequent difficulty of separating the healthy from the sick, their exemption from a disease of so highly contagious a nature affords convincing evidence of the value of vaccination. In the West African squadron, in particular, they are often exposed to the disease, from its breaking out among the natives, who are employed in considerable numbers in working the ship, and who are seldom or never protected by vaccination. Notwithstanding this, only 57 cases and 10 deaths by smallpox occurred in an aggregate force of 24,761 men during the fourteen years 1830—43 inclusive.

### III. THE ROYAL MILITARY ASYLUM.

Since the opening of this institution, in 1803, for the reception of orphans of soldiers, the vaccination register appears to have been kept with great care, and shows in every instance whether a boy, on admission into the establishment, bore marks of smallpox or cow-pox, or was subsequently vaccinated. Satisfactory evidence can therefore in this instance be obtained that they were all protected. The cases that occurred among them up to the 31st of December, 1851, were as follows.

Period.	Aggregate Strength.	Cases of Smallpox.	Died.	Ratio per 1000 of strength.	
				Cases.	Deaths.
15 years . .	31,705	39	4	1·231	0·126

Thus, in a population completely protected, either by smallpox or vaccination, the cases have averaged 123 and the deaths  $12\frac{1}{2}$  in every 100,000, being a still lower proportion than in the army serving in the United Kingdom.

But we are enabled from the records of the Asylum to obtain another description of proof of the efficacy of vaccination. Of 5774 boys taken on the strength of the establishment from its opening in August, 1803, to the 31st December last, 1950 are recorded as having marks of smallpox, 3636 marks of vaccination, and 188 no satisfactory mark of either. The last having been all vaccinated on admission, there were 1950 protected by previous smallpox, and 3824 by vaccination. Among these the cases of smallpox above recorded were distributed as follows :

	No. over whom observations extend.	Of whom subsequently		Ratio per 1000.	
		Had Smallpox.	Died of Smallpox.	Cases.	Deaths.
Boys having marks of smallpox	1950	12	4	6.15	2.05
" " vaccination	3824	27	—	7.06	0.00

This Table shows the protection afforded by vaccination against attacks of this disease, to be very little inferior to that afforded by previous smallpox ; the difference in the prevalence among the two classes having been at the rate of only 9 cases in 10,000 boys, while it is remarkable that all the deaths were from secondary smallpox, not one having occurred among the vaccinated.

The preceding facts appear to afford most conclusive proof of the value of vaccination. The length of time and number of persons over whom the observations extend are sufficient to warrant reliance being placed on the results. In the army it has been ascertained that four fifths of the persons entering it are protected by vaccination. The navy being manned from nearly the same class of the population may be inferred to be protected in the same proportion, and two thirds of the boys admitted into the Royal Military Asylum have borne satisfactory marks. In all of them the remainder were protected by previous attacks of small-

pox. The cases of this disease among a population thus protected have been as follows :

Among every 100,000	Soldiers	there have been 66 cases and 8 deaths
„ „	Sailors	„ 105 „ 5 „
„ „	Boys of the R.M.Asylum	123 „ 12 „

These results are on the whole extremely satisfactory : it may be remarked that the class among whom the largest proportion of cases and deaths occurred was that in which the greatest number was protected by previous smallpox ; and, as before stated, that all the deaths in that class were of boys who had not been vaccinated.

The evidence now laid before the Society appears to have an important bearing on the proposition again to legalise inoculation. The additional chance of exemption from smallpox which would result from having undergone that disease would be very small. But to gain this slight advantage what are the risks we must run ? Even if every person inoculated were previously vaccinated, it cannot be doubted that in some instances the engrafted disease would prove fatal. We should consequently reduce to a certainty that which at present is contingent on the chance of the individual being exposed to contagion. Again, while so large a proportion of the population is unprotected by vaccination, it appears most unjustifiable, for the very slight advantage to be gained from it, to legalise a practice which must to a certainty perpetuate and spread a loathsome and, in unprotected persons, a very fatal disease.

The results, however, not only point out what is inexpedient, but suggest what is advisable. They show the great exemption (not amounting, however, as was at one time anticipated, to absolute immunity,) enjoyed by persons who have undergone vaccination, and thus point out the means of reducing the prevalence and mortality of smallpox to a mere cypher. Why then should not vaccination be made compulsory ? It is true such a measure might be objected to, as interfering with the liberty of the subject, but so, to a certain extent, do all measures relating to public health.

The convenience and prejudices of the few must give way to the interest of the many. The law compels us to carry our drains into the main sewers, forbids us throw rubbish or carry any other nuisance into the streets, as was the custom of our forefathers, puts down or regulates with a high hand any trade supposed to be injurious to the health or admitted to be offensive to the senses of our neighbours, and even compels us in some instances to consume our smoke ; why then should it not enforce a measure which must greatly reduce, if not altogether annihilate, one of the most loathsome diseases that flesh is heir to ? Why should it not prevent the ignorant and the careless from remaining in a position calculated to spread death and misery not only through the neighbourhood in which they reside, but through the length and breadth of the land. In our Factory Acts the principle is recognised of protecting the young and helpless against an amount of labour likely to prove injurious to them, and it would only be an extension of the same humane principle to afford them protection against a malady of so fatal a character.

To our profession the task appears especially to belong of extending the benefits of one of the greatest discoveries ever made. By our personal exertions in promoting, each in his own sphere, the spread of vaccination, and by using our influence in every quarter, to impress upon Government the necessity for some such sanitary law, we shall best fulfil the highest and most important mission of our profession—the prevention of disease.

## ABSTRACT No. I.

*Showing the Admissions into Hospital and Deaths by Smallpox in the Army for the following periods:*

Stations of the Troops.		Periods of Observation.	Aggregate Strength.	Admitted into Hospital for Smallpox.	Died of Smallpox.
Tropical Colonies	United Kingdom { Cavalry . . Foot Guards Infantry . .	10 yrs., 1837-46	54,374	52	2
		do. do.	40,120	133	8
		do. do.	160,103	372	46
	{ Gibraltar . . . . . Malta . . . . . Ionian Islands . . . . Bermudas . . . . . Nova Scotia and New Brunswick . . . . } Canada . . . . . Cape of Good Hope . . Windward and Leeward Command . . . . } Jamaica . . . . . Sierra Leone . . . . . Mauritius . . . . . Ceylon . . . . . Moelmyne . . . . . Madras—Europeans . .	29 yrs., 1818-46	93,400	14	1
		30 „ 1817-46	61,998	30	3
		do. do.	96,494	6	1
		do. do.	22,945	1	—
		do. do.	73,248	12	1
		do. do.	154,736	96	23
		29 yrs., 1818-46	54,291	1	—
		30 „ 1817-46	121,750	7	1
		do. do.	67,714	3	—
		18 yrs., 1819-36	1843	—	—
		29 „ 1818-46	47,848	4	—
		30 „ 1817-46	58,397	12	7
		10 „ 1827-36	6818	2	—
		5 „ 1834-8	45,378	7	2
Total . . .		1,161,457	752	95	

## ABSTRACT No. II.

*Showing the Number of Cases and of Deaths by Smallpox in the Navy for the following periods:*

Naval Commands.	Periods of Observation.	Aggregate Strength.	Cases of Smallpox.	Deaths by Smallpox.
Home Force . . . . .	14 yrs., 1830-43	57,293	83	2
“Various” Force <sup>1</sup> . . . . .	do. do.	20,440	22	1
Mediterranean and Peninsular .	do. do.	135,014	161	10
West Indies and North America	do. do.	49,047	22	3
Cape, and West Coast of Africa	do. do.	24,761	57	10
East Indian . . . . .	do. do.	40,512	43	9
South American . . . . .	do. do.	36,303	29	1
Total . . .	... ..	363,370	417	36

<sup>1</sup> Under this term are included ships, which, “though reckoned on home service are employed occasionally abroad in various detached duties, ships employed in carrying troops, ships fitting out and paying off, and packets while in England.”

A  
CASE OF HÆMORRHAGE  
FROM  
INVERSION OF THE UTERUS

IN WHICH

THE OPERATION OF TRANSFUSION WAS SUCCESSFULLY PERFORMED.

WITH

REMARKS ON THE EMPLOYMENT OF TRANSFUSION GENERALLY.

BY

JOHN SODEN, F.R.C.S.,

SURGEON TO THE BATH GENERAL HOSPITAL.

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Received April 27th.—Read May 11th, 1852.

I am impressed with a strong belief, that the extent of the evidence in favour of transfusion is very little known to the profession at large; that false notions prevail respecting its dangerous character, and the difficulties attending its execution; and that especially it does not receive justice at the hands of modern authorities in the practice of midwifery. It is not surprising that the extravagant results anticipated from its aid when first introduced by Lower and Denys,<sup>1</sup> should have disappointed the enthusiasm of its reception, and should have brought the operation into disuse here, and under the ban of an interdict in France; but it is strange that this prejudice should still continue after the revival of transfusion by Dr. Blundell, upon a rational basis, founded upon extensive

<sup>1</sup> Soon after this operation was introduced at Paris, M. Denys performed it on five human subjects, two of whom recovered of disorders under which they laboured; one, being in perfect health, suffered no inconvenience from it; and two persons who were ill, and submitted to the operation, died; in consequence of which the magistrates of Paris issued a sentence, prohibiting transfusion on human bodies under pain of imprisonment.

physiological experiment, and backed by the evidence so promptly and triumphantly testified to its value by Waller, Doubleday, and many others. My interest was first engaged in the subject of transfusion by an opportunity which occurred to me three years ago, of proving its power in the case which forms the subject of this paper. It appeared to me that the testimony of that case might be materially strengthened by combining with it the results of all the cases on record, and that possibly a sufficient number existed to afford such data as might lead to useful guides in practice, if not to establish positive laws for the employment of this operation. I found, however, that the instances of its general application were as yet too few, except in one class of cases, to admit of exact deductions; I have therefore confined my Table to that exception, which relates to cases of hæmorrhage or exhaustion connected with the puerperal state,—and I think it will be heard with surprise, that the number of cases under this head that has come within my knowledge amounts to thirty-six. I was also influenced in not including in my list the whole field of cases to which this remedy is applicable, by finding in the course of my researches that my own idea had been already anticipated, and most ably executed, by Dr. Routh, in a Paper in the ‘Medical Times’ for August 11, 1849. Dr. Routh’s investigation of the subject is so complete, and our conclusions so perfectly correspond, that I should have thought it unnecessary to have proceeded further, had I not been able to strengthen Dr. Routh’s testimony by much valuable evidence that has accrued since the publication of his remarks, and also, I trust, to show the fallacy of the opinions generally entertained regarding transfusion.

## TABLE

or

*Thirty-six cases in which Transfusion was performed in consequence of Exhaustion or Hemorrhage connected with the Puerperal State.*

No.	Reference.	Particulars of Case.	Amount of Blood Transfused.	Result.
1	Blundell's Physiological Researches, p. 136.	Uterine hæmorrhage "during the birth of the placenta." Respiration had ceased for five or six minutes before transfusion was performed. Sixteen ounces procured from two men; readily injected.	16 oz.	Unsuccessful.
2	—	Uterine hæmorrhage "during the birth of the placenta." Respiration had not ceased, but the patient was in extremis. Three or four ounces only could be obtained from a lady.	3 to 4 oz.	Unsuccessful.
3	Lancet, Oct. 8, 1825; see also Waller's book, 2d case. Mr. Doubleday.	Uterine hæmorrhage after delivery. Blood taken from the husband; when six ounces had been injected, the woman spoke.	About 14 oz.	Recovered.
4	Lancet, Nov. 19, 1825. Dr. Blundell and Dr. Uwins.	Violent flooding after the birth of the placenta. Transfusion performed four hours after hæmorrhage had ceased. Six ounces of blood were injected; this produced immediate improvement. Two hours after her powers again appeared to flag, and six ounces more were introduced. The blood was taken from two individuals.	12 oz.	Recovered.
5	Lancet, March 4, 1826. Mr. Doubleday.	Uterine hæmorrhage. Woman cold and insensible. No particulars.	—	Unsuccessful.
6	Lancet, April 29, 1826. Mr. Waller and Mr. Doubleday.	A female had been confined to bed for three weeks before labour, by severe vomiting, and was so reduced as to be unable to turn in bed without assistance. Shoulder presentation; delivered by turning. Hemorrhage for five hours before delivery; collapse followed, and transfusion was had recourse to.	About 9 oz.	Successful.
7	Lancet, May 29, 1826. Mr. Ralph.	Abortion at the end of the third month. Copious hæmorrhage for ten hours, when Mr. Ralph was sent for. Transfusion performed	4 oz.	Recovered.

No.	Reference.	Particulars of Case.	Amount of Blood Transfused.	Result.
8	Lancet, Feb. 2, 1828. Mr. Clement.	eleven hours after the hemorrhage had ceased. Four ounces only were injected; "in a few minutes animation was apparent." Miscarriage, attended by violent hemorrhage. Mr. Clement opened a vein in either arm, and injected about fifteen ounces from a stout, healthy man. "In a few hours she was perceptibly better," and gradually recovered.	About 15 oz.	Recovered.
9	Lancet, Feb. 9, 1828. Mr. Howell, Mr. Ravis, and Mr. Doubleday.	Transfusion before delivery. A woman had hemorrhage at the commencement of labour; it ceased on the membranes being ruptured. Three hours afterwards labour pains returned, and some degree of hemorrhage; extreme prostration; pulse imperceptible. Blood obtained from the husband, a stout, healthy man. Fifteen ounces injected at intervals in fifty minutes. After five ounces had been introduced, the pulse became perceptible at the wrist; in another hour pains returned, and a dead child was speedily born.	15 oz.	Recovered.
10	Lancet, Jan. 3, 1829. Dr. Blundell, Messrs. Davis, Pointer, and Lambert.	Flooding after the birth of the placenta. Eight ounces of blood transfused, at intervals, in the course of three hours.	8 oz.	Successful.
11	London Medical and Physical Journal, February, 1827. Mr. Barton Brown.	In a tenth labour. Hemorrhage came on before the birth of the placenta; the hand was introduced, and it, with the after-birth, was expelled by the uterine contractions. Flooding ceased, but the collapse continued; stimulants were freely administered, producing a partial rally. Three tolerably smart convulsive attacks at this time ensued, each followed by alarming collapse. Transfusion was had recourse to, two hours and a quarter after delivery. Thirteen drachms were first injected, without effect; after five minutes the same quantity was repeated, upon which the pulse began to return in the radial artery; in ten minutes a third quantity was injected, with increased signs of restoration; a fourth quantity was attempted, but abandoned from the restlessness of the patient.	About 5 oz.	Recovered.
12	London Medical and Physical	Uterine hemorrhage followed the birth of a six months' foetus; pla-	About 4 oz.	Recovered.

Journal, July, 1827. Dr. Douglas Fox.	centa retained by hour-glass contraction. Placenta removed, and the hæmorrhage ceased; but the patient remained in a state of extreme exhaustion. A teaspoonful of blood injected.	—	Successful.
13 American Journal of Medical Sciences, 1830; from Journal Universel, March, 1820.	Uterine hæmorrhage at the third month of gestation. Transfusion successfully performed.		
14 Medico-Chirurgical Review, vol. viii, 1826. Mr. Waller's case. (See his pamphlet.)	Hæmorrhage after expulsion of placenta; perfect collapse; radial pulse just perceptible. Transfusion performed one hour after. Two ounces were injected, without effect; on repeating the amount, a tendency to syncope was observed, the pulse also filling a little, and some effort at vomiting was evinced. These symptoms ceased spontaneously, and the patient recovered.	4 oz.	Recovered.
15 Medico-Chirurgical Review, vol. ix, 1826. Mr. Brigham.	Eighth pregnancy. Hæmorrhage three hours after the birth of the placenta. Five hours after commencement of the hæmorrhage evidently sinking. Two ounces of blood injected with a common syringe; after the third injection the pulse improved. Transfusion continued at intervals of ten or twenty minutes.	10 to 12 oz.	Recovered.
16 Medico-Chirurgical Review. Mr. Jewell's case.	A delicate woman, exhausted by uterine hæmorrhage. No vein being discoverable in the arm, the external jugular vein was opened, and four ounces of blood were injected. No good effect followed, and the patient died. On a post-mortem examination, a small quantity of air was found in the right cardiac cavities; whether introduced by the injection, or the product of decomposition, doubtful.	4 oz.	Unsuccessful.
17 Archives Générales de Médecine, vol. xxiv, 1830. M. Goudin, from Journal des Progrès.	Hæmorrhage in the third month of pregnancy. Blood obtained from a healthy woman; four ounces injected, with a common eight-ounce syringe, two thirds full.	4 oz.	Successful.
18 Archives Générales, vol. iii, 1833. Dr. Baumer's case.	Hæmorrhage from miscarriage, lasting twelve days. Transfusion was employed, with Blundell's apparatus. When five syringefuls had been injected, the breathing seemed oppressed; after a pause, two more syringefuls were thrown in, with increased oppression of the breathing.	Not named, but considerable.	Not recovered.

No	Reference.	Particulars of Case.	Amount of Blood Transfused.	Result.
19	Archives Générales, vol. vi, 1834. Dr. Klett.	Hæmorrhage in the second month of pregnancy. Blood taken from the husband; only two ounces injected.	2 oz.	Successful.
20	Archives Générales, vol. vi, Dr. Klett.	Hæmorrhage for ten hours. Two ounces and a half injected. Taken from the husband.	2½ oz.	Recovered.
21	Archives Générales, vol. xxv, 1851. M. Nitaton.	A woman, aged 20, had gone her full time; labour pains came on, with hæmorrhage, attributed to placenta prævia; delivered by turning. Ergot administered. Her condition rendered transfusion necessary. Three hundred grammes injected, by means of a hydrocele syringe. The cephalic vein was opened by a V shaped incision, and two ligatures placed round it, one to the distal side, to prevent regurgitation of the blood injected, and the other to prevent the admission of air. The patient rallied immediately, and went on well to the seventh day, when abdominal pains appeared, and she died of puerperal peritonitis.	10 to 11 oz.	Successful.
22	Gazette Médicale, 1838, p. 381. M. de Berg.	Hæmorrhage after delivery, which continued at intervals for more than a fortnight, when transfusion became necessary. Two ounces and a half were injected by Dieffenbach's method. Resuscitation very gradual, but complete.	2½ oz.	Successful.
23	Medical Gazette, vol. xiv. Mr. Bickersteth.	Delivery, at the eighth month, of the fourth child. Extensive interuterine hæmorrhage before delivery. In two hours afterwards transfusion performed, death appearing imminent. From ten to twelve ounces were injected; in less than two minutes the patient opened her eyes and showed signs of sensibility.	10 to 12 oz.	Recovered rapidly.
24	Edinburgh Medical and Surgical Journal, No. 145, p. 40. Dr. Oliver.	A very important case. A woman, aged 42, attended by a midwife, with her seventh child. Violent hæmorrhage. Dr. Oliver performed transfusion about twelve hours after the delivery, the patient being in a state of perfect coma, and no pulse having been perceptible in the carotids for two hours and a half. The blood was supplied by three different individuals, and above twenty-two ounces injected gradually and at intervals. The first twelve ounces pro-	22 oz.	Successful.

25	Braithwaite's Retrospect, 1846; Northern Journal of Medicine, December, 1845. Mr. Brown.	duced no effect, but recovery progressed as the injection was produced with.			Recovered immediately.
26	Guy's Hospital Reports, vol. ii, p. 256.	A woman, aged 37, liable to epilepsy. Suddenly attacked during labour with most alarming prostration. Craniotomy performed, and delivery effected. It does not appear that hemorrhage took place, but no rally followed. Four ounces of blood were injected. Placenta presentation; delivered by turning, by Mr. Lever. Great exhaustion from hemorrhage; next morning, after exertion, the exhaustion returned, and threatened to be fatal at 3, p.m. Mr. Tweedie performed transfusion. Seven ounces were injected; the immediate effect was surprising, and animation was restored completely. In an hour afterwards relapse took place; Dr. Ashwell repeated the operation with the same effect, but not to the same degree, and more transient; she died in an hour afterwards.	4 oz.		Unsuccessful.
27	Dr. Collins's Treatise on Midwifery.	A patient in the Dublin Lying-in Hospital. In labour twenty hours, of her thirteenth child; pains severe during the greater part of the time. A quarter of an hour after the birth of the child, a sudden gush of blood took place, but not to a great extent. Dr. Collins introduced his hand, and found the uterus distended with blood; the placenta was readily detached, and the uterus expelled its contents, contracting well. No further hemorrhage, but no rally, took place. The same continued for ten hours; during that time two thirds of a bottle of burned spirit and more than a pint of port wine were administered. Transfusion was then adopted; ten ounces were injected, which caused the woman to mutter indistinctly, but produced no other effect. The circulation was not improved, and she died in a few minutes.	10 oz.		Unsuccessful.
28	Ingleby on Uterine Hemorrhage.	Hemorrhage after expulsion of placenta; prostration. Transfusion six hours after delivery; four ounces injected.	4 oz.		Recovered rapidly.
29	Medical Times, January, 1848. Mr. Greaves; Dr. Waller.	Hemorrhage in the eighth month of pregnancy. Flooding ceased; the vagina was filled with coagulated blood, which it was not thought prudent to disturb. No rally took place, and transfusion was had recourse to. Blood was drawn from a woman; when five	22 oz.		Successful.

No.	Reference.	Particulars of Case.	Amount of Blood Transfused.	Result.
30	Lancet, March 28, 1835. Mr. Healey and Dr. Fraser.	<p>ounces had been introduced, an amendment was evident; pulse more perceptible, and the countenance wore a better aspect. The blood now flowed sluggishly from the woman who supplied it. It was determined to wait; nourishment and stimuli were occasionally administered; after two hours and a half, the patient began again to sink, and jaecitation supervened; four ounces more were again injected from the same individual, but this time without any effect. Blood was then drawn from the husband, a glassful of hot spirits and water having been first given him; the blood flowed from his arm "in an impetuous stream." The first injection of two ounces produced a marked alteration in the pulse; when nine ounces had been introduced the countenance was much improved, and after four ounces more all symptoms of danger had vanished. The case proved to be one of placenta presentation. After some hours' sleep, labour came on, and the woman was safely delivered.</p> <p>A feeble, strumous woman, aged 40. Uterine hemorrhage, with retained placenta. Collapse had lasted six hours. Blood drawn from the husband, ("a strong healthy man;") four ounces transfused; rapid improvement; restoration complete in an hour.</p> <p>Hæmorrhage from abortion, in fifth month of fifth pregnancy. The hæmorrhage had continued for some days, and an alarming condition for four hours. After eight ounces were injected, some rallying signs were observed, and improvement progressed till twenty-four and a half ounces had been transfused, when a slight turbulent action was observed in the carotids; it ceased immediately, and the patient rallied. The blood was supplied by four healthy males. In five days afterwards the bleeding returned, and she sank.</p>	4 oz.	Recovered rapidly.
31	Lancet, 1839-40. Mr. May.		24½ oz.	Successful.
32	Lancet, April 19, 1851. Mr. Masfen.	A delicate lady, aged 38, four months gone in pregnancy, fœtus having been dead two months; flooding; abortion. Transfusion performed two hours after insensibility became complete, blood supplied by a	9 oz.	Successful.

33	Lancet, December 13, 1851. M. Devay.	<p>"stout, buxom-looking servant-maid." Three ounces first injected; some degree of consciousness existed, but transitory; in half an hour a second three ounces injected, again followed by gradual relapse; after an hour a third injection was tried, with permanent restorative effect. Considerable inflammation followed in the vein below the elbow. Total quantity transfused, nine ounces, over a period of an hour and a half.</p> <p>Transfusion performed at the Hôtel Dieu, Lyons, upon a young woman reduced to "mortal debility" by hæmorrhage, with successful result. Particulars not given.</p>	—	Successful.
34	Medical Times, August 9, 1851, reported by Dr. Eyc, from Gazette Médicale, July 5, 1851. Dr. Marmonier.	<p>Case of flooding, after delivery by turning. Dr. Marmonier successfully performed transfusion, without any assistance, and with a child's toy syringe, holding about 70 grammes. The syringe was twice introduced, and about 90 grammes transfused.</p>	About 3 oz.	Successful.
35	Dr. Crosse's Cases in Midwifery.	<p>Patient aged 37. Placenta presentation. Great loss of blood had taken place for three weeks previously. When Dr. Crosse was called in, the patient was "pallid, exhausted, cold, pulse just perceptible." Delivery by turning, without additional loss of blood beyond what is usual. No rally took place. Transfusion performed to the extent of ten ounces, taken from the husband; death within an hour afterwards.</p>	10 oz.	Unsuccessful.

CASE 36.—On January 7th, 1849, a lady was attended in Bath by Mr. Ormond, a gentleman of great experience and intelligence, at the birth of her second child. The labour was rapid, and the latter pains so severe that the uterus was violently emptied of its contents and became inverted; a gush of blood ensued, and the patient fainted—the placenta was detached, and the uterus returned to its natural situation. No further hæmorrhage took place—I joined Mr. Ormond in about half an hour—the patient had not rallied—she was lying on her back, insensible, perfectly cold, pulseless, and exsanguine in appearance—the only signs of life were short, jerking respirations at long intervals, and of a stertorous character. Nothing could look more unpromising than her condition at that time. Mr. Ormond was using means to restore warmth by friction, mustard-poultices, &c., and was administering brandy by teaspoonfuls, which the patient was just able to swallow. These means had now been employed for more than half an hour without any effect, and there scarcely seemed any hope that the patient would recover from the extreme exhaustion in which she then lay. We agreed that transfusion was the only resource, and I left Mr. Ormond to procure the instrument that occurred to me at the moment as best adapted for the purpose. I returned in half an hour, and during the interval Mr. Norman had arrived. No change had taken place in the patient's condition; and as we were now prepared to act, we determined to wait a little longer to watch for any indication of the course the case would take. This was presently afforded in an unmistakable manner. The patient was no longer able to swallow, the respirations became more rare and stertorous, and were evidently on the point of ceasing altogether. Transfusion was now had recourse to, and the following plan was adopted for its execution. My instrument was a well-made syringe of German silver with a detached stop cock, it was larger than was desirable, being capable of holding seven ounces. Mr. Norman exposed the external cephalic vein, by an incision two inches in length, (the arm being fat.) Mr. Ormond bled the

husband, the blood being received into a small deep basin, standing in another containing hot water. As soon as sufficient blood had been drawn, I filled the syringe, previously well warmed and invested with a hot cloth, and at once proceeded to inject the blood into the vein. At first it would not pass up, but returned by the side of the pipe; presently the opposition from the close contact of the coats of the vein seemed to give way, and the blood, though impelled by a steady and moderate pressure, rushed up the vein with a rapidity that the eye could scarcely trace. The effect was electrical; instantaneously a convulsion seized the whole frame, and the muscles of the face were frightfully distorted. I paused in the injection, and I do not think more than an ounce could have found its way into the circulation; happily it was sufficient: the convulsion was but momentary, and signs of returning animation immediately succeeded. A restless movement pervaded the whole body—the arms were tossed over the head, and though consciousness did not return, the patient faintly but audibly spoke, muttering two or three times the expression “so tired,” “so tired,” she seemed to pass from a state of coma into one of syncope. The heart’s action was now distinctly perceptible, and the vital energy gradually but very slowly returned: it was full an hour before any pulse could be felt at the wrist, and though the recovery steadily progressed without relapse, the patient did not recover consciousness until the following morning. During the whole of this time, every means was used to promote warmth, and no difficulty was experienced in getting the stimulants swallowed, that were from time to time administered. Some inflammation was set up in the fore arm below the point of incision, but it was not of any moment, and subsided in two or three days, with the application of fomentations only. I hear from Mr. Ormond, that the patient remained for a long time in an exsanguine state, and complained of weakness and pain in the back. She did not nurse her child, and the catamenia returned in three months. After this period she left for change of air, and Mr. Ormond lost sight of her, but he subsequently heard,

that, suffering from leucorrhœa, she went to London, and was treated for ulceration of the womb. This lady is now in India; recent accounts have been received of the birth of another child, and of the well doing of the mother.

The details of this case exemplify most of the important points connected with the performance of the operation. The rapid and decisive results obtained are by no means singular; on the contrary, the narrators of many of the cases in the Table show parallel success, and describe in forcible language the wonder and surprise excited in their minds by the almost miraculous resuscitations they had witnessed. An analysis of the above Table shows that out of thirty-six cases, twenty-nine were recovered from imminent death by the operation of transfusion, and in seven only its performance was unsuccessful in restoring animation. It does not appear that the fatal termination in any case was due to or hastened by the operation, though, in two instances, the latter effect was, on no warrantable grounds, attributed to its influence.

Of the seven fatal cases—in No. 1, respiration had ceased before the operation was performed, and the injection of twelve ounces produced no effect; in No. 2, the failure was owing to the insufficient supply of blood; in No. 5, it is probable the same cause operated as in No. 1; in No. 16, no effect was produced. No. 26 occurred at Guy's Hospital: when seven ounces had been injected, the immediate effect was surprising, and animation was completely restored; after an hour, relapse took place, and a second injection, by Dr. Ashwell, was attended by a similar reanimating effect, but in a less degree, and more transient; the patient died in an hour afterwards; the case had been one of placenta presentation, and the exhaustion was very great from long-continued hæmorrhage. No. 27 is an important case. It is narrated by Dr. Collins, in his treatise on Midwifery, and occurred during his Mastership at the Dublin Hospital. The circumstances of the case suggested transfusion as the only resource. The remedy, I conclude, did not stand in higher favour with Dr. Collins, than it experienced from most of

the authorities in his branch of the profession ; and the unfavorable result seems, without sufficient grounds, to have strengthened his prejudice against it. A woman, in a very debilitated condition, and reduced by continued exposure to hardship, was admitted into the hospital, in labour of her thirteenth child. "She was not delivered for twenty hours, during the greater part of which time her pains were very severe : her child was born alive. Fifteen or twenty minutes after, a dash of blood suddenly took place from the uterus, not, however, to any unusual extent ; the after-birth had not yet been thrown off." This was removed, and the uterus contracted well : no more blood was lost. The syncope, however, continued, in spite of an enormous quantity of stimulants, and was allowed to go on for ten hours ; then, at the last gasp, transfusion was had recourse to, and "it did not seem to have any more marked effect than that of causing the woman to mutter indistinctly ; the circulation was not improved, though we injected about ten ounces of blood. She expired within a few minutes after the operation." Dr. Collins thinks, though he anticipated her death, that it was hastened by the transfusion. No. 35: this case is equally important. Dr. Crosse, under whose hands it occurred, like Dr. Collins, attributes an injurious influence to the transfusion. The operation was certainly unavailing ; but, considering the circumstances of the case, the general evidence on the subject, and the fact, that no especial symptom was developed, marking its connection with the transfusion, his conclusion seems hardly warranted. A woman, aged thirty-seven, had a placenta presentation ; a great loss of blood had taken place at intervals for three weeks previously. When Dr. Crosse was called in, the patient was "pallid, exhausted, cold, with a pulse just perceptible ;" delivery was speedily accomplished by turning, and without additional loss of blood beyond what is usual ; no rally took place ; transfusion was performed to the extent of ten ounces, taken from her husband's arm. Whilst this was doing, the patient became more distressed, "the pupils dilated, purplish pallor of the face, pulse no longer percep-

tible, death within an hour after." Thus of the seven fatal cases, in two it may be presumed that the women were dead before the operation was performed; in a third, only a small quantity of blood could be procured, and that from a weakly woman; in the fourth, no effect; in the fifth, the first effect of the transfusion was surprisingly restorative, but it was not permanent; in the sixth and seventh cases, of which I have fully given the particulars, the women were too much reduced to be restored,—the one, by too protracted a labour and subsequent collapse; the other, by repeated draining. I think it may be fairly urged that death was inevitable in each of these cases, and that in no instance was it attributable to, nor were any ill consequences produced by, the transfusion. Transfusion is not to be regarded simply as the restoration of a certain deficiency of blood; for the benefit it affords bears but a trifling relation to any rule of loss and supply; nor is its agency to be attributed solely to its mechanical influence, as a warm fluid, upon the heart. The transfusion of human blood may claim to be a direct, powerful,—I might almost add, when applied early,—unfailing stimulus to exhausted energy, even at the lowest point of existence, and when past the restorative aid of any other known means, either extraneous or inherent. The rapidity of the revival, however, varies; it depends not only on the circumstances of the case, as regards the previous duration and cause of the exhaustion, which, as is shown by the Table, exert a material influence upon the power of the remedy, but also upon the character of the means used. Under this head, I include the quantity and quality of the fluid to be transfused, and the mode of performing the operation. Inattention to these three points was, perhaps, the cause of failure in five of the seven unsuccessful cases.

From the Table it appears that the total *quantity* transfused varied exceedingly; the lowest amount named is from one to two ounces; the highest, twenty-four ounces and a half. The intermediate quantities varying a good deal, but with a preponderance to the low amount.

1 oz. was injected in 1 case.	10 oz. were injected in 4 cases.
2 oz.           "       2 cases.	12 oz.       "       1 case.
2½ oz.       "       3 cases.	14 oz.       "       2 cases.
4 oz.       "       7 cases.	15 oz.       "       2 cases.
5 oz.       "       1 case.	16 oz.       "       1 case.
6 oz.       "       2 cases.	22 oz.       "       2 cases.
8 oz.       "       1 case.	24½ oz.     "       1 case.
9 oz.       "       2 cases.	quantity not named in 4 cases. <sup>1</sup>

No mean can be taken from these data to afford any practical guide—the quantity required was determined by the peculiar circumstances of each case; but generally, it may be said, that the lesser amount was needed in proportion as the exhaustion arose from the suddenness of the shock rather than from the extent of the hæmorrhage, and the cases most difficult of revival were those of placenta prævia, where the system had been reduced by repeated returns of hæmorrhage before labour. In Case 36, the heart responded immediately to the application of the stimulus. In Case 24, where the hæmorrhage had been violent, and the coma complete, no pulse having been perceptible in the carotids for two hours and a half, as much as twelve ounces was injected without any effect being produced, but recovery gradually progressed as the injection was proceeded with. It does not appear that too much blood was ever injected, or that any signs presented themselves indicating repletion. A large quantity of fluid may be introduced into the system without ill effect. In cholera, more than one hundred ounces of saline injection were sometimes used. Among the prejudices against transfusion, the fear of serious consequences from engorgement of the brain or heart, by the injection of too large a quantity, has been injuriously influential,—on some occasions the injection was not pushed to the extent of producing any effect; in such cases its power was not tested at all, and life was probably sacrificed by the over-caution of the operator. The evidence regard-

<sup>1</sup> The quantity employed in each of the seven unsuccessful cases in this Table was as follows: in two, 4 oz.; in two, 10 oz.; in one, 14 oz.; in one, 16 oz.; and in one unknown.

ing the *quality* of the fluid transfused is very conclusive as to its importance. The propriety of selecting a good subject to supply the blood has been anticipated, and strongly inculcated by most of the advocates of transfusion; but experience has shown, that this is of more consequence than could have been expected. In the early days of transfusion, the blood of animals was frequently employed;<sup>1</sup> and even recently the blood of a goat was successfully transfused in a case of hæmorrhage from phthisis. With the more accurate knowledge we now possess of the physical distinctions between human blood and that of animals, such an example, though it was successful, is not likely to be followed, and the objections to it are too obvious to need recital. When transfusion was expected to work the miracle of perpetuating youth and curing all diseases, a variety of substances, such as gum, camphor, &c., was introduced into the veins; the failure of these experiments soon brought the remedy into disfavour. The idea, however, of the transfusion of artificial substances is not altogether to be condemned. It appears that the blood transfused may be drawn from different individuals with equally good effect, as from one alone, and that no evil results from the combination. In Case 31, where  $24\frac{1}{2}$  ounces were injected, the blood was drawn from "four healthy males;" in No. 4, from two individuals; in No. 24, from three; in No. 29, from two—and this case is important, as showing the value to be attached to the character of the blood. The blood transfused was first taken from a weakly woman: when five ounces had been injected an amendment was evident, and the pulse became perceptible; as the blood now flowed sluggishly from the woman who supplied it, it was determined to wait; after two hours and a half the patient again began to sink and jactitation supervened—four more ounces were again injected from the same individual, but this time without any effect. Blood was then drawn from the husband, a glassful of hot spirits and water having been first given him; the

<sup>1</sup> Journal de Pharmacie, May 1842. Dr. Blieding.

blood flowed from his arm "in an impetuous stream;" the first injection of two ounces produced 'a marked improvement. The plan of saline injections in cholera, led Dr. Simpson, of Edinburgh,<sup>1</sup> to adopt it in cases of exhaustion from uterine hæmorrhage. Dr. Simpson tried it in three cases, and in each unsuccessfully; a very slight attempt at restoration was manifested, and the patients all died. There is nothing in the details of these cases to show that the injection of human blood would not have succeeded in them, as well as in any of those in the Table. The complete failure of the saline injection in Dr. Simpson's cases of uterine hæmorrhage, shows a favorable contrast in its partial success in cholera, and renders it evident that, that success was due to the character of the fluid transfused. In cholera there was an error in the quality, as well as a deficiency in the quantity of the blood, which the saline injection was well calculated to remedy. Had the principle been fully carried out, by the combined transfusion of human blood with the saline fluid, a more satisfactory result would probably have been attained.

Regarding the *mode of performing* transfusion, I have come to the usual conclusion, that the most simple means are the best. No instrument is so convenient or so safe for the purpose, as a common syringe. It should be accurately made, fitted with a detached stop-cock, plated or tinned on the inside, and capable of holding about three ounces. An infinite variety of apparatus has been invented for transfusing, not so much with the object of facilitating its performance, as of guarding against the danger of admitting air with the fluid injected; a danger that is nearly imaginary, and not founded on any ground of probability. An impression of this danger so generally exists in the profession, that it has been the greatest obstacle to the more frequent employment of transfusion. In many of the cases cited, the instrument made use of is not mentioned; sometimes a special apparatus was employed, and often a common syringe.

<sup>1</sup> Northern Journal of Medicine, February 1849, p. 500.

No difficulty appears to have been experienced from the nature of the instrument used, except in one instance, and in that case the special apparatus was changed for a simple syringe. Dr. Marmonier, Case 34, is said to have used a common child's toy syringe; and great credit is due to him, that with such simple means, and without assistance, he undertook and successfully performed the operation. In the account of Case No. 36, I have stated the impediment the empty state of the vein seemed to offer to the entrance of the blood, and that on the opposition being overcome the wave of blood was traced with great rapidity towards the heart. It is well known that the danger of air finding admission into the veins is greater in operations about the neck than in those upon the extremities. I do not imagine that this circumstance depends upon the greater size of the veins, or their contiguity to the heart, as in the former case, but on the mechanical cause of the different incidence of the atmospheric pressure. A vein when divided remains empty for a considerable distance above the point of division, and the air is prevented from entering by its own external pressure along the trunk; by this means, the coats of the vein are maintained in contact. In the neck this does not so well apply; the external pressure can there only fall upon the orifice, when the division is low down, and not upon the trunk beyond; consequently, there is less opposition to the suction of the air into the vacuum of the vein: on this account a vein in the neck ought never to be chosen for the operation. In all the cases in the list, the usual situation of venesection was adopted, except in one instance, No. 16, where the external jugular was selected, from there being no apparent vein in the arm; the patient died in an hour after the transfusion. As the presence of air was, on a post-mortem examination, demonstrated in the heart, a doubt existed whether it was attributable to the injection or to decomposition. No circumstances occurred at the moment of transfusion to indicate that the accident had happened; and where it has taken place in the division

of veins during an operation, it has always declared itself,—sometimes by an audible sound with which the air rushes into the vacuum. In performing transfusion there is but one source of danger from this circumstance, and strangely enough, though it is the most obvious, it has been entirely overlooked by the different inventors of special apparatus. Many of their instruments are ingeniously calculated to promote the very object they are designed to prevent, namely, the passage of air with the blood through the instrument, and none of them offer an equal security, on this point, to a common syringe when used with proper and obvious precautions. The syringe has also the same advantage against the only chance through which the air might gain admission into the vein, in a dangerous form, for a few bubbles injected with the blood are unimportant, and that is, its passage, by the side of the instrument, into the empty vein, when the coats of the latter are separated by the introduction of the pipe; pressure beyond the opening till the blood is emerging from the syringe, would effectually guard against this possibility, or by the injection being performed under water.

In Case 36, convulsions attended the entrance of the blood into the circulation. In proof that this circumstance was not dependent on any irritating quality in the blood injected, and that it was really only an indication of rallying power in the transition from a state of coma to one of syncope, it occurred no less than three times in Case 11 after the exhibition of stimulants, and before transfusion was performed. In one case, No. 14, a slight oppression in the breathing was observed, but it did not interfere with the recovery. In two instances phlebitis followed the operation, Nos. 32, 36. It was not to a serious extent, and in both cases was confined to the fore arm, below the orifice in the vein.

A perusal of the details of the cases I have collected leaves little room for doubt as to the propriety of the operation in all of them; but, as the opinions on the nature

and treatment of uterine hæmorrhage are so various, this conclusion may not be accepted; I will, therefore, presently bring forward some negative evidence that will tend to its justification.

A diversity of opinion exists in the profession as to the extent to which interference should be carried in the management of uterine hæmorrhage. Few agree with the authority who has asserted, that "no woman would die, if let alone." Generally speaking, the recurrence of uterine hæmorrhage is considered to be under the same influence that renders a return of bleeding liable in the case of a divided artery; and the fainting and exhaustion are regarded as equally salutary in both instances. It may be so in some cases; but where the hæmorrhage occurs after the uterus is emptied of its contents, and in consequence of its energy being too exhausted to maintain a sufficient contraction; to restore the vital power as speedily as possible is a better security against a further bleeding, than to allow the patient to remain in a state of syncope, waiting for a sign of reanimation that is too often never evinced. No doubt an over-anxiety and too zealous an interference may be prejudicial, but this very circumstance, in my mind, affords a strong ground for inculcating a knowledge of the benefits of transfusion. I cannot agree with Dr. Ramsbotham,<sup>1</sup> that an evil would result from its more general advocacy, in leading to its unnecessary employment; on the contrary, I think that the stronger his confidence in the power of transfusion, with so much the greater patience and calmness would the medical attendant first avail himself of the more simple resources his experience suggested.

Dr. Churchill's<sup>2</sup> statistics, which are perhaps the most complete extant, show that out of 630 cases of hæmorrhage 111 mothers were lost, or about 1 in  $5\frac{1}{2}$ . Dr. Robert Lee's and Dr. Ramsbotham's valuable reports in the 'Medical Gazette' confirm Dr. Churchill's testimony to this high rate

<sup>1</sup> Ramsbotham's *Obstetric Medicine*, p. 552.

<sup>2</sup> Churchill's *Midwifery*, p. 398.

of mortality, but it does not appear that Dr. Lee or Dr. Ramsbotham ever had recourse to transfusion. It is true there are cases in the 'Reports' of both these gentlemen that would justify the hope of recovery from any state of exhaustion without the aid of transfusion. On the other hand, there are several that terminated fatally without exhibiting any signs to distinguish them from those in which the more fortunate result took place. I will quote one of these cases from its similarity to No. 36, and because it aptly shows that the cases of prostration from the suddenness of the shock, and where no great amount of blood has been lost, and in which transfusion is of most value, are as dangerous as those from excessive hæmorrhage. The case was one of inversion of the uterus, with very little hæmorrhage. Dr. Ramsbotham says,<sup>1</sup> "I was with the patient about an hour after the occurrence had happened. She was then dying, apparently from the shock the system had sustained, certainly not from loss of blood. I was assured by the midwife in attendance, who is a well-informed and careful woman, and on whose word I can rely, that not the least effort had been made to extract the placenta; but that directly after it had passed she felt the tumour in the vagina. The patient died before I left the house." On Dr. Ramsbotham's arrival the woman was perhaps too far gone for transfusion to have been adopted with success. The same however cannot be said of the following case. On May 7th, 1851, Dr. E. Smith related a "fatal case of inversion of the uterus" before the Medical Society of London. I take the report from the 'Lancet.' Dr. Smith stated that the woman was 35 years of age. She was delivered by a midwife of her second child at 11, P.M., May 5th. Dr. Smith saw her soon afterwards. He found the uterus inverted and protruding through the vulvæ, with the placenta attached. The amount of blood lost did not appear to be excessive, and the patient was conscious, but becoming exhausted. Dr. Smith summoned two neighbouring practitioners to his assistance. An attempt was made to return the uterus

<sup>1</sup> Medical Gazette, October 3, 1851.

with the placenta attached; it failed, however, but its reduction was effected after the removal of the placenta. No amendment took place on the restoration of the uterus. The prostration increased in spite of every care and the steady administration of stimulants, half a pint of brandy having been given in three hours. The patient died between 2 and 3, A.M. A post-mortem examination was made, and Dr. Smith gave as his opinion of the cause of death, at the inquest, that the patient had died from the shock upon the nervous system, induced partly by the loss of blood, and partly by the violent inversion of the uterus. Dr. Smith winds up his observations upon the case, which are sensible and to the purpose, with the question, "Was transfusion indicated in this case?"

In conclusion I will briefly remark on the general applicability of this remedy. An equal success has attended its adoption in the exhaustion caused simply by loss of blood under any circumstances. It has been chiefly tried after wounds and operations, of which Dr. Routh gives many examples. Its power is equally great where the diminished blood in the system depends upon inanition, as upon direct loss. A very valuable case illustrating this point has been published by the late Dr. Pritchard and Mr. Clarke.<sup>1</sup> The case was one of atrophy from dyspepsia and constant vomiting. Sixteen oz. were injected, and the patient instantly revived, and completely recovered in three months. Transfusion has been of temporary service even where organic disease has been present, as phthisis and cancer of the stomach. Where an animal poison exists in the system in an active form, it has not been successful, as in hydrophobia, where it failed in the hands of Dieffenbach and Magendie; but this is almost an untried field. Dr. Routh especially alludes to the benefit that might be expected from its employment in the collapse of typhus fever. I witnessed its trial in a case of this description, several years ago, by Dr. Stokes, at the Meath Hospital. The patient was a middle-aged woman. Eight or ten ounces were injected; a faint

<sup>1</sup> Provincial Medical and Surgical Journal.

and but momentary indication of rallying was induced. The injection was not repeated, and the woman died in three days afterwards.

Dr. Routh also suggests its use in the diarrhœa of children, where fatal exhaustion is threatened. There are most promising indications for its employment under this head. The numbers of children who die from defective nutrition, arising from imperfect power of assimilation,—their aspect years behind the standard of their age,—who drag on, by aid of iron, iodine, and now of cod-liver oil, a miserable existence, to be at last prematurely terminated,—in such cases it is not irrational to anticipate that transfusion, when fairly tested, may prove a remedial agent of greater power and efficiency than any we now possess.



AN ANALYSIS OF  
ONE HUNDRED CASES  
OF  
CANCEROUS DISEASE OF THE UTERUS.

BY  
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THE most important diseases of the human uterus accompanied with sensible alteration of structure may be divided into three classes :

1. Those which are produced by inflammation of one or more of the textures which enter into the composition of the uterus.

2. Those which arise from the formation of tumours in the parietes of the organ, or from enlargement of the glands situated in its orifice, which have no tendency to degenerate into a malignant form, and do not contaminate the surrounding structures.

3. Those which result from a specific and malignant action of the uterus, by which its different textures and the adjacent viscera become disorganised.

The phenomena and the treatment of the diseases comprehended in the first two of these classes, I have endeavoured to describe and delineate in vols. XV and XVI of the 'Medico-Chirurgical Transactions.'

I now beg leave to present to the Society an Analysis of One Hundred Cases of Cancerous Disease of the Uterus, to serve as a record of facts, for the purpose of illustrating,—

1st. The ages at which these diseases most frequently occur or come under observation.

2d. The symptoms which characterise the early and advanced stages of the malignant diseases of the uterus.

3d. The morbid alterations of structure observed at the commencement and at the termination of these diseases; and,—

4th. The treatment which palliates most effectually the sufferings of those afflicted with these incurable maladies.

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
1	1828, Oct. 20.	Mrs. Hinckley, 18, Sherrard street.	45	M.	Burning and lancinating pain within the pelvis; coloured discharge and sickness of two years' duration. Anodynes. Os and cervix uteri entirely destroyed by ulceration; right ureter greatly distended; kidney converted into a sac; fundus and body of uterus apparently healthy; coats of bladder thickened and indurated. Three years' almost constant pain within the pelvis; five months' copious fetid discharge of pus or bloody serum; bladder and rectum perforated; orifice and neck of uterus destroyed by ulceration; body and fundus little changed; vagina extensively ulcerated, and coats indurated.
2	1828, Nov. 29.	Mrs. Prentice, with Dr. J. Prout.	56	M.	Sense of bearing down, in 1824; menorrhagia, in 1826; a tumour in the right iliac region; uterus enlarged, orifice open, and a tumour felt within, in October, 1828, with salowness, sickness, dyspnoea, oedema of the feet; pulse 120; vomiting; tympanites. Died 11th December. Post-mortem appearances: Ovaria contained cysts; a fibrous tumour of uterus; cavity filled with a matter like soft cheese; mucous and muscular coats extensively disorganised.
3	1828, Dec. 11.	Miss Chalton.	47	S.	Menorrhagia for an uncertain period; no other symptom of uterine disease; acute peritonitis before death. Post-mortem appearances: Fallopian tubes enlarged, middle coat of a gristly hardness; canals filled with dark fluid; corpora fibriata large, hard, ragged, their inner surface ulcerated, adhering to the ovaria, enlarged; coats of uterus yellow, and softened at the fundus.
4	1829, March 2.	Case, St. Thomas's Hospital.	28	S.	Hæmorrhage; died suddenly with symptoms of enteritis. Post-mortem appearances: Peritonitis; a large lobulated tumour, in some parts black, in others of a bright red, adhering to the omentum, caput coli, muscles, and blood-vessels at the brim of the pelvis, and filling a great part of cavity of pelvis; a great part of mucous and muscular coats destroyed, and a ragged, fungous mass growing from the remaining portion of muscular coat; a fibrous tumour in the walls.
5	1829, June 11.	Case with Dr. H. Davies and Mr. Jones.	45	M.	Pain in the uterus for months; fetid, serous, and bloody discharge. Died with the symptoms of typhus fever. Post-mortem appearances: Uterus enlarged, muscular coat of body and fundus affected with scirrhus; anterior lip of os uteri destroyed by ulceration; a soft cancerous fungus growing from the inner surface of posterior lip and cervix; a scirrhus tumour on the left side of the neck of the uterus.
6	1829, June 20.	Case with Dr. H. Ley.	45	M.	

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
7	1829, March 25.	Mrs. Taylor.	50	M.	A large cancerous fungus growing from the os uteri; little pain; discharges of serum and blood frequent and profuse. Duration of disease not ascertained.
8	1829, Jan. 24.	A lady.	50	M.	Sanguineous discharges, with pain and general weakness; became fetid some months before death, and bladder perforated. Post-mortem appearances: Uterus three times the natural size; os and cervix destroyed by ulceration, bladder having around the opening a cancerous fungus growing into its cavity; right ureter dilated, and its coats thickened and indurated; substance of kidney partially absorbed.
9	1829, Oct. 29.	Mrs. Sibert, with Dr. J. Prout.	46	M.	Burning pain in the uterus three months; the sufferings for a month before death of the most excruciating kind. Little relief from the largest anodynes. Anterior wall of vagina and coats of bladder destroyed by ulceration; lower portion of vagina coated with lymph; lips of uterus entirely removed; neck, body, and fundus uteri apparently healthy; no appearance of cancer around the uterus.
10	1829, Dec. 20.	Case with Mr. Lawrence, at St. Bartholomew's Hospital.	40	M.	Long suffering from pain, discharge, and other symptoms of cancer. Post-mortem appearances: Os and cervix destroyed by ulceration; body and fundus nearly in the natural state; left uterine veins and arteries imbedded in a semi-cartilaginous cancerous mass, full of cells filled with pus; hypogastric, common iliac, and external and femoral veins, obstructed and lined with false membranes.
11	1829, July 27.	Case at Bayswater, with Mr. Girdwood.	40	Unmarried.	Pain and discharge for many months; phlegmasia dolens in left lower extremity, five weeks before death. Post-mortem appearances: Os and cervix destroyed by ulceration; body and fundus uteri little changed; peritonitis; a large mass of a hard consistence on the left side of uterus; iliac and femoral veins inflamed and obstructed. (See Med.-Chir. Trans., vol. xv, p. 60.)
12	1829, Sept. 12.	Mrs. Page.	46	M.	Disease of uterus ascertained to exist for several years; pain during the last six months of her life; constant fetid discharge and occasional profuse hemorrhage; vagina filled with a fungoid tumour, the neck of which grew by a broad base from the whole os uteri. Post-mortem appearances: Extensive peritonitis; a soft, yellowish, tattered mass adhering to the os uteri neck of the uterus, like hard; body of uterus hard, like cartilage, and of a dull yellow colour.

13	1830, March 24.	Case with Dr. J. Prout.	M.	Severe and protracted sufferings. Extensive cancerous ulceration of uterus and vagina; bladder and rectum perforated. No relief from anodynes. Os, cervix, and nearly the entire body of the uterus destroyed; ulceration had reached peritoneum of fundus, which it had penetrated, and also the ilium, which adhered to fundus uteri; coats of vagina near the orifice were thick, hard, and contracted; scirrhous masses on both sides of uterus.
14	1830, March 25.	Case at Paddington.	Uncertain.	Pain in the region of the uterus, and discharges, for upwards of two years; a tense, painful swelling of left lower extremity took place a month before death. Post-mortem appearances: Os and cervix and vagina destroyed by ulceration; vena cava, iliac, and femoral veins inflamed and obstructed; fundus and body of uterus apparently healthy.
15	1830, April 30.	Case with Drs. J. Prout and Grant.	Ditto	Long suffering from symptoms of stricture of the rectum; left ovarium cancerous; adhesions between peritoneal coat of uterus behind rectum and left ovarium; mucous and muscular coats of fundus uteri converted into a soft matter like cheese; fundus uteri hard and irregular, though but little enlarged; on left side of uterus peritoneal coat at one part alone remained; adhesion between this and the ovarium; os and cervix uteri healthy.
16	1830, May 30.	Mrs. C—, 44, Upper Rathbone place.	M.	Catamenia irregular; pain in the back, hypogastrium, and loins; sense of bearing down; enaciation; habitual mucous discharge, tinged with blood, coagula occasionally; dyspuca; death took place eleven weeks after the patient came under observation. Post-mortem appearance: Os uteri hard, irregular, and ulcerated. Two years' great pain in uterus, sacrum, loins, and thighs; copious discharges; sickness; sallowness; an irregular fungoid mass growing from os uteri; phlegmasia dolens in both lower extremities; perforation of bladder. Post-mortem appearances: A spongy cancerous fungus within the bladder; os and cervix and body of uterus converted into a substance like lard or brain; vena cava, iliac, and femoral veins inflamed and obstructed.
17	1830, Dec. 15.	Case with Dr. H. Ley.	M.	Leucorrhœa streaked with blood; pain; profuse serous, purulent, sanguineous fetid discharge; symptoms of acute peritonitis before death. Post-mortem appearances: Whole sac of peritoneum inflamed; perforation of peritoneum of fundus uteri; black sloughing border; peritoneum of uterus behind affected with melanosis; os and cervix uteri destroyed by ulceration, and walls of vagina converted into a soft substance like lard.
18	1831.	Case with Mr. Jones.	M.	

No	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
19	1829, May 9.	A lady, with Mr. Griffith.	50 (about)	M.	Had been suffering for some time with symptoms of cancer of the uterus; was seized on the 9th of May, 1829, with frequent vomiting, diarrhoea, and unremitting severe pain in the uterus; became sallow and emaciated, and there was a constant discharge of a dark-coloured watery fluid from the vagina: on the 27th, aphthous ulceration of the mouth took place, and retention of urine; died at the end of June. Post-mortem appearances: Anterior lip of os uteri, and the greater part of its internal surface and of the cervix, disorganised by cancer, a small, rugged, fungoid growth hanging from them into the vagina, the mucous membrane of which was ulcerated; branches of left hypogastric vein filled with dense coagula; left spermatic coated with false membrane; veins of right side in the same condition. (See preparation.)
20	1832, March.	Case, St. James's Infirmary.	40	Uncertain.	Had died after long suffering with pain, discharge, and other symptoms of cancer uteri. Post-mortem appearances: The rectum adhered firmly to the uterus; on the left side of the uterus there was a large mass of a yellowish-white colour, the central part of which resembled custard.
21	1832, March 4.	Case, St. Mary-le-bone Infirmary.	46	Ditto	Constant severe pain and fetid discharge for many months. Post-mortem appearances: The orifice and cervix uteri entirely destroyed; no enlargement or change of structure in the portion of the uterus that remained; perforation of the rectum.
22	1835.	Mrs. B—, with Mr. Saunders.	55	M.	Suffered during fourteen months from occasional attacks of uterine hæmorrhage; a white discharge from vagina, with pain in the sacrum and hypogastrium; retention of urine for two months, requiring the catheter. Post-mortem appearance: Extensive ulceration of uterus and vagina.
23	1836, Nov. 2.	Case, St. George's Hospital.	23	S.	Died after long-continued severe suffering from uterine pain and profuse discharge. Post-mortem appearances: The upper part of the vagina and os uteri destroyed by ulceration; the part of the uterus that remained had a medullary appearance.
24	1836, Nov.	Case, St. George's Hospital.	28	Uncertain.	The sufferings in this case were violent and protracted. Post-mortem appearances: The fundus and body of uterus in a hard scirrhous state; os and cervix completely destroyed by ulceration; about the middle of the vagina the coats formed a hard ring, where the ulceration ended; bladder perforated.

25	1836, Dec. 29.	Case with Dr. Scott.	45	S.	Repeated attacks of uterine hæmorrhage in the course of three years. Post-mortem appearances: Uterus much enlarged; os and cervix in a perfectly healthy state; mucous membrane and a great portion of the muscular coat of the fundus and body had entirely disappeared; cavity of uterus presented an irregular, tattered, yellowish appearance; a fibrous tumour in the anterior wall.
26	1837.	Case with Dr. J. Prout.	40	Uncertain.	Pain in the situation of the lower part of the uterus and fetid discharge were the chief symptoms; phlegmasia dolens in left inferior extremity. Post-mortem appearances: Os and cervix uteri destroyed by necration; body and fundus neither enlarged nor apparently altered in structure; extensive peritonitis; a cancerous mass situated on the left side of the uterus; iliac and femoral veins obstructed.
27	1839.	A lady, with Dr. Gardner.	52	M.	After suffering for some months from general debility and loss of appetite, suddenly seized with profuse uterine hæmorrhage; afterwards thin fetid discharge; sallowness; slight occasional pain about the sacrum, groins, and posterior surface of the thighs; nausea; vomiting; fever; a great malignant fungoid tumour filling up the vagina, harder in some parts than in others; a portion of tumour covered with a membrane, other parts destroyed by ulceration. This case proceeded rapidly to a fatal termination.
28	1838.	Case with Mr. Gellatly.	27	M.	Leucorrhœa in 1836. No pain, and general health good; discharge ceased for a time after the use of cubebæ and astringent injections; afterwards a thin discharge, occasionally tinged with blood. Feb. 1838, profuse hæmorrhage. May 1838, vagina filled with a large irregular fungoid tumour growing from the entire os uteri; lobulated anterior portion harder than posterior, and covered with a smooth membrane; root of tumour divided with a ligature; afterwards thin profuse discharge; œdema of lower extremities. Post-mortem appearances: Uterine peritoneum studded with cancerous tubercles; body and fundus uteri in a scirrhus state; a large cancerous tumour protruding into the cavity of the bladder; a soft, broken-down, fungoid mass adhering to the whole os uteri.
29	1838, Dec.	Case at St. George's Hospital.	40	Uncertain.	In December, 1838, a large, irregular, fungoid tumour filled the upper part of the vagina, and grew from the whole os uteri, supposed by a practitioner to be a common fibrous polypus, and a proposal made to tie its root. Died in March, 1839, exhausted with pain, discharge, and sympathetic irritation. Post-mortem appearances: Ulceration of os and cervix uteri and vagina; tumour had almost entirely disappeared; a fungoid tumour growing from the coats of the

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
30	1838, May 9.	Anne West, St. George's Hospital.	46	M.	bladder; a scirrhus mass on the left side of the uterus; iliac and femoral veins obstructed. Sharp lancinating pains in the loins, abdomen, and thighs, with difficult micturition; urine acid; ankles swollen. May 21: bladder sounded, and no calculi detected. 9th June: ascertained that menstruation had ceased two years before, and that ever since there had been slight pale discharge, which had at times a fetid odour; the os uteri and anterior wall of the vagina hard and irregular, and at one point ulceration had commenced. Duration of disease unknown.
31	1838, June 23.	Case with Mr. French.	60	Uncertain.	Symptoms of cancer uteri had long been present, and long before death Mr. French knew that ulceration existed. Post-mortem appearances: Os and cervix uteri and upper part of vagina almost entirely destroyed by ulceration; bladder perforated; fundus and body of uterus not enlarged, but the muscular coat was harder than natural; the lining membrane of the cavity of the uterus was covered with numerous small cancerous tubercles; ulceration behind had reached the uterine peritoneum, and to this the corpora fibriata adhered. Both ovaria contained cysts. Pain over the hypogastrium, in the loins and thighs; difficulty in passing the urine; yellow discharge from the vagina; disease had commenced eight months before with profuse uterine hæmorrhage; extensive induration and ulceration of the os uteri and upper part of vagina; sickness; vomiting; constant fetid discharge: on the 7th May two quarts of blood suddenly discharged; afterwards urine flowed involuntarily. Symptoms continued till the 23d May, when a half-decomposed, ragged, flocculent mass escaped from the vagina: on the 28th uterine hæmorrhage returned, and she died suddenly.
32	1838, March 31.	Mary Peaton.	32	M.	Uterine hæmorrhage for nine months before the patient came under my observation; this had occurred at intervals without pain; general health good; then a brown-coloured fetid discharge, nausea, debility, soreness about the back, groins, and thighs, and sensation of bearing down; left foot and ankle swollen; a long, hard, irregular-shaped cancerous fungous tumour growing from the posterior lip of os uteri. 23d August, tied with a ligature. Died April 19th, 1839, with vomiting, fetid discharge, and great sense of oppression about the region of the heart.
33	1838, Aug. 14.	Mrs. White, with Dr. Duffin.	46	M.	

34	1838, Oct.	Mrs. Hill.	40	M.	Post-mortem appearances: Both sacs of the pleura contained serum, and the surface of the heart and inner surface of the pericardium coated with lymph; portions of the ileum adhered to the back part of the uterus, upper part of which traversed by white hard bands; a dark-coloured fungous mass occupied the situation of the os and cervix uteri; coats of bladder thick and hard; ureters dilated. The father of this patient had died of cancer. Uterine hemorrhage with severe pain, afterwards discharge, thin, and having an offensive odour; emaciation and debility; upper part of vagina felt like a hard cartilaginous ring. Post-mortem appearances: Extensive peritonitis; fundus and body of uterus slightly enlarged, but the coats apparently healthy; os and part of cervix uteri and upper part of vagina destroyed by ulceration; the part of the cervix which remained had a soft, black, flocculent appearance, as if gangrenous or sloughing; rectum perforated. Two years before had begun to suffer from pain in the right iliac region and attacks of uterine hemorrhage; extensive induration and ulceration of the uterus and vagina; bladder perforated. The date of the patient's death not ascertained.
35	1838, Nov.	Elizabeth Goodard, St. George's Hospital.	46	M.	This patient died from an encyphaloid tumour of the lungs on the right side. Post-mortem appearances: The neck of the uterus hard, like cartilage; at the uterine orifice of the cervix, a small hard tubercle, with an irregular surface, raising and involving the mucous membrane of the part; the mucous membrane, cellular tissue, and muscular coat, to a small depth, were all changed; the muscular coat of the neck of the uterus was hard, and of a bluish-yellow colour; this change had extended only midway between the mucous membrane and peritoneum behind; parts not vascular.
36	1839, March 4.	Case, St. George's Hospital.	42	Uncertain.	During five months, profuse discharges of blood from the uterus; no pain; a tumour the size of a large pear growing from the anterior lip of the os uteri, by a slender peduncle; surface of tumour irregular, density not uniform, covered by a thin smooth membrane; on the left side of the vagina there was a small, hard, cancerous tubercle, which, in the course of no long period, became a fungoid tumour of considerable size; coats of vagina around affected with scirrhus.
37	1839, March 22.	Case with Mr. G. Webster.	56	M.	This patient died from disease of the brain. Post-mortem appearances: Uterus not enlarged; anterior lip hard, and of a dark-red mottled appearance; muscular coat beneath this indurated, and of a dull white colour; the mucous membrane of the posterior lip was partially destroyed by ulceration; what remained was yellow,
38	1839, April 22.	Case, St. George's Hospital.	46	Uncertain.	

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
39	1839, March 21.	Case with Dr. B. Brown.	35	M.	hard, and irregular; the muscular coat of posterior lip hard, like cartilage, and of a dull white colour. Irregular menstruation in 1838, then a great discharge of blood; no pain; orifice unusually open; posterior lip ulcerated, and cervix hard and enlarged. 16th June: Occasional returns of hæmorrhage, and in the intervals a copious, fetid, yellowish or reddish discharge; sallowness; upper part of vagina filled with fungous masses, growing from the os and cervix uteri. 28th September: Pain and profuse discharge; great fetor; appetite good; strength improved. Three months the symptoms had undergone no change.
40	1839, June.	Case, St. George's Hospital.	55	Unmarried.	One of the mammae had been removed some time before death for cancer. Post-mortem appearances: Brain and spinal cord affected with malignant disease; peritoneum covered with cancerous tubercles; ovaria affected with cancer; two small vascular, fungoid tumours growing from or beneath the lining membrane of the cavity of the uterus.
41	1839, Sept. 22.	Case with Mr. Jones, Union Workhouse.	45	M.	The right mamma of this woman had been amputated, in the Middlesex Hospital, some time before her death; the disease had returned; some months before her decease excruciating pains were experienced in the abdomen. Post-mortem appearances: Hard scirrhous tumours in the lungs and pericardium; the peritoneal sac covered with small cancerous tubercles; the uterine and ovarian peritoneum covered with tubercles; the muscular coats of the uterus healthy.
42	1839, Dec.	Case, St. George's Hospital.	40	Unmarried.	Profuse discharge of blood from the uterus several months before the patient was seen; then a large, irregular, fungoid mass, in a state of ulceration, growing from the uterus: fetid discharge; slight dull pain in the back; sickness; sallowness; gradual exhaustion.
43	1839, Sept. 26.	A lady, with Mr. Hutchinson.	46	M.	Leucorrhœa during two years, without pain; Spring of 1839, pain in the region of the uterus, with red-coloured discharge; os and cervix uteri hard, irregular, and ulcerated. The disease ran its usual course, and terminated fatally not many months after.
44	1840, April 3.	Mrs. R—.	35	M.	April, 1840, a fungoid, cancerous mass growing from the os uteri; in May it was ascertained that pregnancy existed; delivery took place spontaneously, 14th July;

45	1840, April 13.	Mrs. C—.	38	M. two chil- dren.	the symptoms of cancer for a time disappeared, but returned, and proved fatal, 1st January, 1841. Twelve months' dull pain in the region of the uterus; then a discharge of watery or bloody fluid during six months, flatulence, loss of appetite and strength; os uteri hard, irregular, ulcerated at the back part, bleeding when touched. The disease extended to the vagina and surrounding parts, and proved fatal four months after, with great suffering.
46	1840, April 13.	Mrs. B—, with Dr. Stodart.	60	M. children.	Pain in the back and loins; sickness; emaciation; sallowness; occasional profuse discharges of serous and blood and fluid; vagina hard and ulcerated; os and cervix uteri completely disorganised. The disease had commenced a year before, and it proved fatal about six months after.
47	1840, May 1.	Mrs. A—, with Dr. Cross.	41	M.	Twenty-four hours in labour, at the full period; os uteri indurated and ulcerated; symptoms of cancer had commenced two years before, and the pain and discharge increased after conception; delivery effected by craniotomy. Died 4th May. Neck of uterus lacerated; presented the appearance of a dark-coloured, disorganised mass.
48	1840, June 15.	Mrs. S.	47	M.	Great pain in the uterus and rectum; general health impaired; fetid discharge; os uteri irregular; cervix hard. Leeches applied to the anus without any benefit. The subsequent course of the disease imperfectly known.
49	1841	Mrs. B—.	46	M., 1 child 22 years before.	Ill sixteen months; a discharge, sometimes watery, at other times thick and bloody; sickness at stomach; pain in the sacrum, extending down the thighs and legs; debility; emaciation; os uteri and upper part of vagina hard and ulcerated. Catamenia ceased at 45; three months ago seized with pain in the uterus; irritation of bladder; debility; no emaciation, but abdomen shrunk; os uteri hard, irregular, lips everted; vagina affected; slight sanguineous and watery discharge; tepid hip-bath and injections. Anodynes.
50	1841, October.	Mrs. —, sister of Dr. Colin Mac- kenzie.	60	M.	Carcinomatous ulceration of uterus, vagina, and rectum; the cervix uteri and upper part of vagina completely destroyed by malignant ulceration; peritoneum between vagina and rectum nearly perforated; layer of lymph there effused; a large opening between rectum and vagina; a small opening into the bladder; body of uterus apparently healthy.
51	1842, July 31.	Letitia Woodgate, St. George's Hos- pital.	31	Uncer- tain.	
52	1843, March 3.	Mrs. L—.	40	M. children.	This patient seen only once; abortion had taken place eight months before; excreting pain, day and night, in the back and within the pelvis; hæmorrhage;

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
53	1843, July 31.	Mrs. P—.	56	M. children.	profuse fetid discharge; remarkable loss of muscular strength. The disease proved fatal a few months after. Pain in the sacrum, loins, and thighs; profuse fetid watery, and sometimes sanguineous and purulent, discharge; sickness; loss of appetite; emaciation; extensive induration and ulceration of the upper part of vagina and uterus; the sufferings great and protracted, and little relief from anodynes and all other remedies.
54	1844, Feb.	Case with Mr. Woolmer.	45	M.	Scirrhus ulceration of os uteri and vagina; fetid, serous, purulent, and occasionally ichorous discharge, with pain of more or less intensity at intervals.
55	1844, Feb.	Case, London-road, with Mr. Hooper.	45	M.	The sister of Mr. Hooper, who was dying, when seen by me, of cancerous ulceration of the uterus and vagina; the bladder and rectum were both injured by the disease before it had run its course, which was attended with dreadful sufferings.
56	1844, April.	Mrs. B—.	54	M.	Hæmorrhage; purulent discharge from the vagina commenced eight months ago; now in a nervous condition, almost hysterical; a great fungoid, cancerous tumour growing from the os uteri; vagina hard and ulcerated. This case went on rapidly to a fatal termination.
57	1844, Sept. 7.	Mrs. J—.	47	M. ten children.	Six months ago seized with uterine hæmorrhage; no pain; a copious discharge, like the lochia, almost constantly ever since; now a little pain in the back and lower part of the abdomen; a great mass of fungoid cancerous disease growing from the os and cervix uteri; swelling of the feet and ankles. Nearly every day during the last month caustic has been applied through the speculum, without benefit; losing ground and becoming weaker daily. Died soon after.
58	1844, Oct. 3.	Mrs. S—, with Mr. N. Smith, Clifton	33	M. four children.	Emaciation; pulse 120; slowness; almost constant pain in the sacrum and left groin; irritation of the bladder; feeling of bearing down; os and cervix uteri large and hard; an irregular fungoid tumour growing from the whole orifice; fetid discharge. Disease commenced nineteen months ago; grandmother died of cancer uteri. At first supposed to have been pregnant and miscarried; of late constant draining of thin, bloody, fetid fluid. Proved fatal in a few months.
59	1844, Nov.	Mrs. L—.	34	M. eleven children.	Complains of pain in the right groin and right side of the hypogastrium; occasional hæmorrhage; leucorrhœa in the intervals; anterior lip of os uteri projects unusually; cervix behind thick, hard, and irregular; body of uterus enlarged; no

60	1845.	Mrs. H—.	47	M.	ulceration. Existence of malignant disease strongly suspected in this case. Result unknown.
61	1845, April 3.	Mrs. C—.	46	M. children.	A great fungoid, cancerous tumour, filling the upper part of the vagina, and growing from the whole os uteri. Caustic applied through the speculum; symptoms aggravated by the treatment. The history of the case led to the conclusion that the disease had commenced the previous June.
62	1845, May 2.	Case with Dr. Hull.	53	M. children.	Sense of bearing down about two years, followed by a pale, slimy, fetid discharge; catamenia regular two years ago; little pieces like flesh have at different times come away from the vagina, and at other times coagula of blood; pain in left side of hypogastrum; now a profuse pale, offensive discharge; right leg swollen; anterior part of uterus greatly enlarged; os and cervix uteri hard and ulcerated.
63	1845, July 1.	Mrs. H—, with Mr. Balderson.	60	M.	Catamenia had ceased three years; in October, and again at Christmas, a coloured discharge; pain, at first slight, in the hypogastrum has been gradually increasing; sickness; debility; emaciation; os and cervix uteri and a great part of vagina affected with scirrhus ulceration. Disease soon fatal.
64	1845, Oct. 20.	Mrs. S—.	34	M.	Great discharge in October last; loss of appetite and strength. Alum injection; mineral acids. Discharge ceased for a time; returned in January; in June, profuse, with pain of the loins and sacrum in paroxysms; irritation of the rectum, and burning pain on the right side of uterus; extensive scirrhus ulceration of uterus and vagina.
65	1845, Nov. 1.	Mrs. H—, with Mr. York.	37	M. children.	A profuse watery discharge since Christmas; portions of a tumour said to have been cut away soon after from the vagina. September, great hemorrhage; operation repeated. Oxyuriate of potash and matrico-leaves prescribed, and liquor potasse. The vagina now filled with a great fungoid cancerous tumour; profuse uterine hemorrhage; so feeble that she cannot walk. Did not long survive.
66	1845, Dec. 8	Mrs. M—, with Mr. Porter.	35	M. children.	Six months ago profuse leucorrhœa; aching about the thighs; pain in the bladder and uterus; sense of weariness; fetid discharge; sallowiness; emaciation; appetite good; os uteri hard, irregular, gaping, ulcerated. Caustic applied through the speculum about fifty times; continued till the time of her death.
					Uterine hemorrhage in the eighth month of pregnancy; placenta at first supposed to be present; a large, soft, cancerous tumour growing from the entire circumference of os uteri; cervix in a scirrhus condition. Died on the 14th December, undelivered. Post-mortem appearance: Os and cervix uteri disorganised with cancer.

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
67	1845, Dec.	Mrs. K—.	43	M.	<p>Uterus in an advanced stage of cancerous ulceration. A sister of this lady died from cancer of the breast; another sister, aged 33, is now reported to be dying from cancer of the uterus.</p>
68	1846	Mrs. L—, with Mr. Pollock.	42	M.	<p>Pain in the region of the uterus, and thin, slightly discoloured discharge; pain has become greater and almost constant, and the discharge fetid; cervix uteri hard, knobbed; orifice irregular and ulcerated. Anodynes; leeches occasionally; injections; hip-bath. Died May 26, 1846.</p>
69	1846, March 9.	A lady, with Dr. H. Davies.	32	M. two children.	<p>An abortion three years ago; almost constant discharge during the last six weeks; now pain in the lower part of the back, extending down the thighs; palpitation of heart; sense of sinking. Her mother died of cancer of the uterus at the age of 46. The os uteri hard and irregular, gaping, and the posterior lip ulcerated. May 6th: Coagula of blood discharged; pain much aggravated. June 10th: Profuse hæmorrhage; ulceration has extended to the vagina. July: No better. Leeches, sarsaparilla, tepid baths, anodynes. The disease proceeded rapidly.</p>
70	1846	Mrs. L—.	49	M.	<p>Catamenia have ceased two years; great pain in the back, hips, and down the thighs during three months; sickness at stomach; debility; watery discharge; swelling of the feet and ankles; extensive hardness and ulceration of uterus and vagina. Caustic, through the symptoms, frequently applied with mischievous effects. Hæmorrhage and severe pain. 12th January, 1847: Great pain at night; discharge not fetid; lived several months in a state of the greatest suffering.</p>
71	1847, May.	A lady, with Mr. Pyne Royston.	51	M. three children.	<p>Catamenia ceased three years; a coloured discharge appeared fourteen months ago, which has continued; coagula occasionally pass; pain in the sacrum and thighs; sickness; debility; irritation of bladder; hæmorrhoids; lips of os uteri partially destroyed; orifice wide open; fetid discharge; glands of groin indurated.</p>
72	1848, May 22.	Mrs. N—, with Mr. Tippets, Dartford.	50	M. sterile.	<p>A small hard knob or projection from the inner surface of the posterior lip of the os uteri; anterior lip thin, smooth, and soft; except this, hardness in the posterior lip, and shooting pains about the uterus; no symptom of cancer; seen through the speculum, both lips red; a small quantity of bloody fluid seen oozing from the os uteri; discharge and other symptoms of cancer took place more than a year</p>

73	1848.	Mrs. B—.	45	M.	afterwards, and Mr. Tippetts informed me that the patient died of scirrhus ulceration in 1851. Considerable discharge from the vagina, and irritation about the bladder, for six months. Mr. Aston Key then examined, and expressed a suspicion that malignant disease existed; now she describes the pain as racking and burning; there is difficulty in passing the urine; sickness; loss of strength; occasional hæmorrhage, and almost constant fetid discharge; cancerous ulceration far advanced.
74	1848, June 20.	Mrs. A—, with Dr. Ashwell and Mr. Aston Key.	60	M. one child.	Catamenia have ceased ten years; three months ago, when in perfect health, a slight show took place; then leucorrhœa, without pain; then a sensation as if the catamenia were about to reappear; the pain has since been in the back and all round, with sense of bearing down; anterior lip of os uteri healthy, posterior swollen and bulging out, irregular, and slightly ulcerated; discharge has a peculiar odour. In September, os uteri harder and more irregular; pain distressing; no doubt that cancer exists; speculum and caustic proposed, but rejected; emaciation; weakness; soreness of the back; œdema of feet; bladder and rectum both perforated. Died 3d September, 1850, after remaining long in a state of insensibility and complete unconsciousness.
75	1848, Aug. 14.	Mrs. C—, with Mr. Marshall.	56	M. children.	Catamenia have long ceased; leucorrhœa during a year occasionally mixed with a thick purulent-looking matter; no suspicion till a few days ago of the existence of any organic disease when Mr. Marshall made an examination, and found the os and cervix uteri hard, thickened, and ulcerated. The disease went on very slowly to the usual termination.
76	1849, May 5.	Mrs. B—, with Mr. Smith, Richmond.	42	M. one child.	Symptoms of cancer uteri commenced in October last; but out of health eighteen months before. Now great pain in the uterus; hæmorrhage; profuse fetid watery discharge; sickness in the morning; great weakness, and some emaciation. About two inches from the ostium vaginae the finger came in contact with a hard, lobulated, fungoid mass. The danger of exciting hæmorrhage prevented the connections of the root of the tumour being ascertained. The disease proceeded rapidly.
77	1849, May.	A lady, with Dr. Ashwell.	48	M. seven children.	Ulcerated carcinoma of uterus and vagina in an advanced stage; the discharge controlled apparently for a time by the frequent application of lunar caustic; sickness; emaciation; pallor; bladder affected. Dr. — consulted, who affirmed that he had cured similar cases in Scotland. A strong prospect held out of relief at

No.	Date.	Name.	Age.	Married Single.	Symptoms, Treatment, and Morbid Appearances.
78	1849, Aug. 9.	Lady M.—.	44	M.	Edinburgh. Died soon after her arrival there, from hæmorrhage and exhaustion; and in about three weeks was buried in Kensal Green Cemetery. In good health eighteen months ago, when uterine hæmorrhage occurred; great lassitude and sickness at stomach; profuse fetid discharge; os uteri hard, irregular, and ulcerated, and vagina bleeding when touched. The local and constitutional symptoms gradually became more severe.
79	1849, July 28.	Mrs. S—, with Mr. G. Pollock.	50	M. sterile.	About the 29th of May first began to complain of pain, especially in the left groin; this pain has gradually increased all round the pelvis, and especially down the left thigh; three or four months before that had discharge sometimes coloured; feels certain that the disease has been coming on for twelve months; sallowness of complexion; emaciation; she was not well, but there was no distinct symptom. Her sufferings are now become excruciating. Mr. Pollock examined her four weeks ago, and found the body of the uterus larger than natural; round the incatus urinarius and within the vagina there were several hard tubercles of a very suspicious character; I found the os and cervix uteri perfectly sound; the back part of the body of the uterus was hard and bulging, as if a fibrous tumour had occupied the posterior wall of the uterus; severe suffering till death. Post-mortem appearances: An enccephaloid disease occupied the posterior wall of the uterus, and the tubercles in the vagina were found to be cancerous.
80	1850, Jan. 15.	Mrs. W—, with Dr. Duffin.	33	M.	Profuse watery discharge from the vagina during twelve months, and a kind of gnawing pain in the back; there is an irregular lobulated mass growing from the whole posterior part of the vagina and os uteri, a large cauliflower-like excrescence. It was proposed to employ caustic through the speculum, but the practice was not had recourse to.
81	1850, June 20.	Mrs. L—.	59	M. sterile.	Watery discharge, and occasionally discharges of blood took place four years after the cessation of the catamenia. At the end of three years a small vascular tumour, the size of a pea was seen through the speculum, protruding through the os uteri; it increased rapidly, and no doubt was entertained by me that it was of a malignant nature; great quiet, and soothing remedies recommended. Went to Edinburgh, where it was proposed to apply potassa fusa to the parts; the tumour was afterwards

82	—	Case, St. George's Hospital.	35 (about)	—	repeatedly destroyed by caustic, but grew again; the discharge became more profuse and offensive. Died in a state of stupor, June 20th, 1850. Duration of disease six years.
83	1850, Jan. 3.	Case with Mr. Ince.	46	S.	Several years ago a woman with cancer of the uterus, three months pregnant, was a patient in St. George's Hospital. Labour came on at the end of the seventh month; fetus extracted by Mr. Price, of Margate, with the vectis; symptoms of ruptured uterus soon followed. Post-mortem appearances: The whole orifice and neck of the uterus destroyed by cancerous ulceration and cervix lacerated. This lady had enjoyed good health till twelve months before, when, without any obvious cause, a habitual profuse watery discharge, occasionally tinged with blood, took place from the vagina without the slightest pain. Mr. Ince had ascertained, a few days before, that the vagina was filled up to the orifice with a soft doughy tumour, smooth in some parts and rough and irregular in others. The root of this tumour grew from the whole of the lower part of the uterus; there could be no doubt that it was a malignant fungoid disease, and beyond checking the discharge and supporting the patient's strength, nothing was attempted. The disease proved fatal three months after. (See Preparation.)
84	1850, Aug. 30.	Mrs. B—, Southampton.	47	M.	Long subject to leucorrhœa; during two preceding years catamenia more frequent than usual; debility. Since April hardly ever free from coloured discharge, and has had more pain extending down the thighs; irritation of the bladder. There existed great hardness and ulceration of the os uteri; uterus firmly joined to the parts around in the pelvis. Saw through the speculum a bloody ulcerated surface. This patient was alive about a year after this. Has since died.
85	1843, July 16.	Case, St. George's Hospital: Elizabeth Cousins.	56	—	The parts were removed together from the pelvis; the internal surface of the bladder presented several small medullary tubercles, situated below the mucous membrane, and projecting into the bladder. One of these was the size of a large bean. The os uteri had completely disappeared, and a ragged ulcerated surface occupied its situation. The whole of the uterus was converted into one mass of encephaloid disease, portions of which were broken down to the consistence of cream. The parts surrounding the uterus were so involved in the disease that its outline could no longer be distinguished. Within the broad ligaments were numerous small encephaloid deposits. A large deposit of encephaloid matter found underneath the

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
86	1844, Aug. 21.	Mrs. C—, with Mr. H. Gilbert, St. Leonards.	65	M. children.	peritoneum, opposite the left foramen ovale. Some parts of this were soft and mixed with blood. The glands in the left groin similar in structure. Eighteen months before this, an alarming flooding; from this time the discharge described continued. About six weeks before this date, tenesmus, and dysuria, and sense of bearing down; discharge from the vagina upwards of a year, slightly offensive at times; sudden hæmorrhage from the uterus; "os uteri very irregular, hard, unyielding, slightly nodulated, filling up too much of the cavity of the pelvis;" finger covered with sanious fluid. "The most redeeming part of the case is that she has had no pain," observed Mr. Gilbert. Nov. 4th. Cancerous disease proceeding in its usual course; appetite lost; great general weakness; thin and emaciated, and attacks of sinking; severe pain. Died in three months.
87	1849, March 29.	Case with Mr. G. Webster.	50	S.	Scirrhus ulceration of os uteri and vagina; profuse fetid discharge; violent attacks of pain coming on periodically at a fixed period every afternoon, and lasting for several hours, as in Case 79. The speculum and caustic had been employed diligently with no good effect. Vomiting; emaciation; great debility, and exhaustion.
88	—	Mrs. H—, with Mr. G. Pollock.	54	M. children.	Ulcerated scirrhus of the uterus and vagina, and profuse fetid discharge wholly unaccompanied with pain, and the disease ran its course to a fatal termination more than a year after this without any pain having ever been experienced. Coma preceded death.
89	1851, Dec. 1.	Mrs. B—.	46	M. sterile.	A large soft tumour filling up the uterus felt through its orifice. Os uteri healthy; neck shortened; body greatly enlarged; a profuse watery and bloody discharge. Doubtful if a malignant disease. April 14, 1852. Uterus still more enlarged; orifice more open; portions of the tumour having an œncephaloid character have come away; now a more profuse offensive bloody discharge; great emaciation and debility.
90	1851, Sept. 2.	Mrs. A—, with Dr. Julius.	28	M.	Leucorrhœa during two years; constant profuse offensive discharge since the month of May; occasional attacks of hæmorrhage; discharge sometimes has a yellow colour, like pus; pain in the loins; a great fungoid tumour filling up the vagina. The case proved fatal in about two months.

91	1851, Nov. 26.	Mrs. F—, with Mr. Keen, Chelsea.	51	M.	Catamenia ceased twelve months ago; has been subject to irregular discharges of blood from vagina; now suffering from a large carbuncle on the loins. "Her mother died of a bleeding tumour of the womb." Mr. Keen made an examination and found a tumour attached to the anterior lip of the os uteri. I found an irregular fungoid cancerous tumour growing from the anterior lip. Tonics; sarsaparilla; astringents. Cachexia; oedema of feet; ascites. Died on the 1st Jan. 1852.
92	1851, April 28.	Case, Dr. Bence Jones, St. George's Hospital.	26	S.	Os and cervix uteri affected with cancerous ulceration; profuse offensive discharge; constant intense pain; retention of urine; sickness; vomiting. Died in a few days. Duration of disease about eight months. Post-mortem appearance: Cervix uteri entirely obliterated; the whole internal surface of the uterus occupied with a mass of soft fetid ulcerated tissue of a greenish-brown hue; substance of uterus greatly enlarged, and at the fundus much thickened; lower portion of posterior wall infiltrated with cancerous matter.
93	1851, Dec. 14.	Mrs. H—, South- ampton.	42	M. one child.	In good health till eighteen months ago, then a slight watery discharge without pain; hæmorrhage followed the use of the speculum and caustic; discharge became profuse, with a disagreeable odour. A large fungoid cancerous tumour in the vagina, springing from the whole os uteri. Evacuation; debility; sallow as if jaundiced.
94	1851, April 29.	Mrs. P—, with Mr. Pollock, Ken- sington.	52 or more	M.	Carcinomatous ulceration of the os and cervix uteri and vagina; profuse serous, purulent, and fetid discharges, with pain in the sacrum and within the pelvis; emaciation and gradual loss of strength during the progress of the disease. "Previous to her death there was a communication with the rectum and bladder, so that both were evacuated by the vagina." Died April 29, 1851.
95	1851, May 3.	Case of Dr. Nairne, St. George's Hos- pital.	43	M.	Without any apparent cause eighteen months before attacked with uterine hæmorrhage. This soon ceased, but was followed by pain, sense of bearing down; a serous fetid discharge; difficulty in voiding the urine; emaciation; debility; sickness. A large, hard, irregular cancerous tumour filling the upper part of the vagina.
96	1852, Jan. 30.	Mrs. T—, with Dr. Elliott and Sir B. Brodie.	60	M. children.	A large tumour, hard in some parts and soft in others, growing by a thick root from the posterior lip of the os uteri. The cervix around nodulated. Anterior lip hard, irregular, and ulcerated. Considerable discharge, not offensive; little pain; sickness; emaciation; loss of strength. There could be no doubt that cancerous disease of the uterus existed in this case, and no attempt was made to remove or destroy the tumour. Conium; sarsaparilla; quiet employed.

No.	Date.	Name.	Age.	Married or Single.	Symptoms, Treatment, and Morbid Appearances.
97	1852, January.	Mrs. M—, Oxford-terrace, King's-road, Chelsea.	52	M. children.	Extensive scirrhus ulceration of the vagina and os uteri; profuse offensive discharge; coloured serum-like oelre. Sometimes most excruciating pain. In April the disease had extended near to the ostium vaginæ; bladder and rectum both perforated; emaciation; sickness; attacks of sinking, and horrible sufferings. Death. Catamenia regular till eighteen months ago. In ill health upwards of a year; constant red-coloured or greenish discharge, with peculiar fetor; sickness; emaciation. A fungoid cancerous tumour growing from the posterior lip of the os uteri, and filling up the back part of the vagina. The anterior lip affected with scirrhus ulceration. Little or no acute pain. A sensation, almost constant, as if the catamenia were about to appear.
98	1852, March 21.	Mrs. P—, with Mr. Randolph, Westminster.	38	M. sterile.	Constant discharge during two years. A recent miscarriage supposed to have taken place. Dr. Power had, fourteen days before, examined with the speculum and seen extensive ulceration of the os uteri; lunar caustic applied four times without any good effect. Now pains in the sacrum, lower part of the abdomen, and down the thighs. With the finger it was readily ascertained that extensive scirrhus ulceration of the uterus and vagina existed. Uterus fixed in the pelvis.
99	1852, March 19.	Mrs. B—, with Dr. Power.	32	M. children.	The speculum and caustic had been employed in this case before the patient had been seen by Dr. Farish and Mr. Hodgson. Catamenia had ceased two years before; repeated hemorrhages; general health not much impaired; the vagina filled with an irregular cancerous fungoid mass, springing from the os uteri and anterior wall of vagina; a profuse ichorous discharge; little or no pain. Sponge with gallic acid used, and anodynes. April: Constitution now suffering. Died.
100	1852, Feb. 23.	Mrs. R—, with Dr. Farish and Mr. Hodgson.	50	M. children.	

From the preceding Analysis it appears,—

1st. That cancer may commence in any part of the mucous, muscular, or peritoneal coats of the uterus; but most frequently in the os and cervix.

2dly. That the earliest symptoms of the disease, in a large proportion of cases, were discharges of sanguineous, serous, or white-coloured fluid from the vagina, with sense of uneasiness, or pain more or less acute, within and around the pelvis.

3dly. That cancerous disease of the uterus presented itself most frequently in the form of induration and ulceration of the os and cervix uteri and vagina, or ulceration without induration, or in the form of fungoid tumours, usually called cauliflower excrescences, growing from one of the lips, or the whole os uteri, being often associated with encephaloid and colloid masses, and true scirrhus of the remaining portions of the uterus and contiguous viscera.

4thly. That in no case could cancerous disease of the uterus be referred to inflammation, and that its fatal progress was never arrested by cauterising the morbid structures through the speculum, or by any other method of treatment.

*The following Table shows the ages at which the foregoing Hundred Cases of Cancerous Disease of the Uterus occurred:*

1	at 23	years of age	}	6 under 30.
1	"	26		
1	"	27		
3	"	28		
1	"	31	}	16 from 31 to 39.
3	"	32		
2	"	33		
2	"	34		
4	"	35		
1	"	37		
2	"	38		
1	"	39		

8	at 40	years of age	}	52 from 40 to 50 inclusive.
1	"	41		
4	"	42		
2	"	43		
1	"	44		
8	"	45		
13	"	46		
5	"	47		
1	"	48		
1	"	49		
8	"	50		
2	"	51	}	25 from 51 to 60 inclusive.
3	"	52		
1	"	53		
2	"	54		
2	"	55		
6	"	56		
2	"	59		
7	"	60		
1	"	65		1 at 65.

AN ACCOUNT OF A CASE  
OF  
PULSATING TUMOUR,  
IN WHICH  
THE URINE CONTAINED CANCER CELLS.

BY  
CHARLES H. MOORE,  
SURGEON TO THE MIDDLESEX HOSPITAL.

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Received May 25.—Read June 22d, 1852.

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James Hawks, æt. 53, a greengrocer, was admitted into the Middlesex Hospital, January 20, 1852, with considerable œdema of the whole of his left lower extremity, and complaining of pain in the groin and knee. He was tall and spare; his hair was of an iron grey colour, and his eyes blue; his countenance generally was rather sallow, but his cheek was ruddy.

The left lower extremity was half as large again as the right, and its cutaneous vessels congested. The œdema reached to the crest of the ilium, enlarging the buttock; and the abdominal walls pitted slightly on pressure for some inches above the groin.

On examining the groin, it was found swollen, and its fold almost obliterated by a large pulsating tumour, which lay behind the abdominal muscles. A small portion only of the tumour could be felt below Poupart's ligament, but it extended upward towards the umbilicus, beyond the horizontal level of the anterior superior spine of the ilium.

It occupied the situation of the external iliac artery, and projected about equally on either side of that vessel. Inward, it reached nearly to the mesial line, and outward, far into the iliac fossa, its whole breadth being apparently about six inches. It was not moveable. The greater part of its surface was smooth and firm; but it was lobulated at four or five spots, and the prominent parts were soft.

The tumour could be both seen and felt to pulsate at every beat of the heart. The impulse was distinct, whether the hand were laid upon the tumour or grasped it, and was stronger when the femoral artery was compressed. Yet, though strong, the pulsation was less than is generally felt when a large aneurism, full of fluid blood, communicates freely with a large artery. The force of the pulsation varied at different parts of the tumour; it was greater outside than within, at the soft prominences than at the level and firmer parts: the beat was weak on either side of the external iliac artery, which was, consequently, readily distinguished to be raised and stretched over the front of the tumour.

A rough and loud murmur could be heard over the whole tumour and at the back of the ilium. All the arteries of the body beat hard and round, with a vibrating thrill, at about 90. In the tibial vessels the pulse was weaker on the left than on the right side. The heart was without morbid sound. The lungs were emphysematous, and the chest barrel-shaped.

The glands in the groins were distinct, but not enlarged. A small hard lump, long transversely, could be felt just above Poupart's ligament, on the right side, and superficial to the external iliac artery.

He stated that his father had died suddenly, in four or five minutes after having been seized with a pain in his stomach; that, in his own occupation he was accustomed to stand long, and to carry weights; but that he knew no reason for the disease in his groin, unless it were a fall down an area, that had happened to him eighteen months ago. He had had

acute rheumatism, once severely, and more than once slightly; and he was subject to palpitation and epistaxis.

His account of the present disease varied continually, and he sometimes gave two histories during the same interview. The most credible one seemed to be that it had begun three months before with swelling of both knees; that the swelling of the right subsided, while that of the left extended to the whole limb. His first pain was of a gnawing character, and was felt in the knee. It extended to the ankle, and was then followed by a stiffness and slight aching in the groin. About three weeks before his admission, he noticed a slight beating in the groin, and he has lately suffered severe pain in that part. About a month ago, he used to pass an unusual quantity of water, and was compelled to void it six or seven times in the night. The bowels were costive, and required large doses of medicine to move them; but no collection of obstructed fæces could be detected.

My first impression as to the nature of this disease was, that it was an enlargement, possibly of malignant character, of the iliac glands. The burden of the diagnosis rested upon the character of the tumour; for the presence of œdema determined only the fact of obstruction to the femoral and other vessels, and nothing as to the nature of that obstruction. There could not but, indeed, be a strong presumption that any tumour, of short duration, situated precisely in the course of a large artery, and having both pulsation and bruit, must be an aneurism, however its pulsation and bruit might be modified. Yet, when neither the force of its pulsation nor the character of its bruit were proportioned to its bulk, (supposing it to be an aneurism), when the pulsation, though distinct, was not universal, and the tumour in parts felt even firm, a reasonable doubt might be entertained of its being of that nature. The patient's aspect confirmed that doubt; and a strong solution of iodine was accordingly ordered to be washed over the surface covering the tumour.

During the following eight days he was kept quiet in

bed, was occasionally purged, and in the latter part of that period was kept on spare diet. The œdema of the limb and force of the pulse diminished, and the murmur audible in the tumour became soft : but during the same period the tumour itself enlarged one fourth in size, another soft pulsating prominence formed on it, the pulsation acquired new force, and a great increase of pain took place. The pain assumed a strong pulsatile character, and was so severe as to prevent his sleeping.

Not every large artery, raised and stretched by a tumour, communicates pulsation to that tumour. It is not uncommon to meet with tumours, both solid and fluid, having that relation to large arterial trunks, yet without a trace of pulsation.

On the other hand, so rare are the instances in which tumours that are not aneurismal, have a vigorous pulsation, that it may be said to be the duty of the surgeon, when in charge of such a case, to prove that it is *not* of that nature before he is at liberty to withhold the remedial measure, which is indispensable in a like case of aneurism. Recalling, then, the facts, that this tumour had a lateral and a slightly expanding, as well as a forward beat, and that it occupied precisely the situation of an iliac aneurism ; observing further, that while the general circulation had become tranquil, and averaged seventy-two beats in the minute instead of ninety, yet the tumour had increased both in bulk and in the vigour of its pulsation, and its wall had yielded and become soft at a new place ; and considering also that the proximity of the external iliac artery alone could certainly not account for the force of the pulsation ; I could not resist the presumption arising from the likeness of the tumour to an aneurism. There was one contingency, suggested to me by a case of aneurism which I had previously witnessed, which not only appeared likely to exist, but also furnished a probable solution of the peculiarities of the case. It was that of the aneurism having been formed high up at the back of the artery, and of a great part of the blood in it having

coagulated. The case to which I refer, was one in which a large aneurism in the calf possessed a feeble bruit in its early stage, but no pulsation during the time in which I had the opportunity of observing it, and felt so firm that, amidst conflicting opinions, it was rather held to be an encephaloid tumour than an aneurism. The inch of posterior tibial trunk that intervenes between the origins of the anterior tibial and peroneal arteries, had given way on its anterior surface. The anterior tibial bound the open vessel down to the interosseous ligament, and prevented its rising with the aneurism. The force of the current of blood escaping from the vessel was therefore spent against the bone, and had eroded it, whilst that collected in the sac, receiving only a weak reflected impulse of the arterial current, had coagulated.

Upon the presumption that the case was one of aneurism, no delay was admissible in resorting to the indispensable remedial measure. The tumour reached too high to leave any hope of success from the ligature of the external iliac artery, and it therefore became requisite to secure the common iliac.

The operation was performed as far back as possible, to avoid separating the peritoneum from its connections to an unnecessary extent, as well as to escape the dangers involved in the anterior operation, from the close adhesion that membrane sometimes has to the tumour. A curved incision along the crest of the ilium, commencing at the extremity of the twelfth rib, and ending an inch from the anterior superior spine, afforded ample space for the necessary manipulation. The only unusual occurrence was hæmorrhage, to the extent of six or eight ounces, from the loose tissue behind the peritonæum.

Although the patient's lungs were known to be emphysematous, chloroform was not withheld; it was administered with much caution. The inhaler was often taken away for one or two breaths, and when he struggled, or became livid, or his pulse flagged, it was removed altogether. A quarter of an hour consequently elapsed before he was ready for the operation, but at length after a struggle, in

which his pupils contracted, and his pulse rose to 120, his limbs relaxed, and his pulse fell to 80. The influence of the chloroform was obtained and kept up without inconvenience, and without any apparent danger.

When the operation was concluded, he continued for half an hour in a state of catalepsy. He was easily roused from it, but soon relapsed. His pulse meanwhile was at 64, and his face and lips were pallid.

As consciousness partly returned, he felt pain in the groin; and an hour or two after the operation it became so severe that he was constantly groaning on account of it. It was relieved by some large doses of opium, but returned through the evening and night, as often as the effect of the opium passed off—even while the pupil remained contracted.

In the forenoon of the day following the operation he had little pain, and having taken no opium since 4½ A.M., he was recovering from the drowsiness which he had experienced from the combined effect of the chloroform and opium. His pulse had risen to 128; and the left limb, which had been colder than the right after the ligature of its arterial trunk, was five degrees warmer than the other limb at the foot, and half a degree warmer at the groin.

At 5, P.M., he began to vomit small quantities of his food, and in the evening tenderness was felt near the wound, and a copious oozing took place from it. Tympanites at the same time came on, and drowsiness. Towards night the circulation through the left limb failed: its entire surface became mottled with patches of stagnant or nearly stagnant blood, its superficial veins refilled slowly when emptied by pressure, and the temperature diminished.

In the night a deep stupor came on, and at 8, A.M., the following morning, forty-three hours after the operation, he died comatose,—the failure in the circulation of the limb becoming more marked, and the foot at last being observed to be shrunken and dark.

*Examination of the body twenty-eight hours after death.*

—The whole body presented proofs of extreme decomposition of the blood. It exhaled an extremely offensive odour, and the course of the cutaneous veins was in many parts marked by dark puce-coloured lines of transuded blood. The whole of the left lower extremity was deeply stained and mottled from the same cause, and the colour was darker than it had been during life. Most of the loose cellular tissue contained bubbles of air. A gust of putrid gas escaped from the peritonæal cavity as soon as it was opened, and the peritonæal surface of the stomach was raised by very numerous and large air-vesicles. The left leg crepitated slightly, though it was not swollen, with emphysema. The pleuræ contained bloody serum, but no air was ascertained to have been formed in them, or in the pericardium. In the anterior chamber of the right eye, however, a bubble of air floated, which was equal in bulk to one fourth or one fifth of the whole aqueous humour.

The wound was covered with unorganised lymph. The peritonæum was entire; but slight inflammation had taken place over more than one third of it: the inflammation was most marked in that part which adjoined the wound. The peritonæum presented lines of vascularity wherever portions of bowel adjoined; there was a trifling loss of the lustre of the serous surface; and the fluid at the back of the cavity was slightly turbid. The liver was large and fatty, the spleen small and soft.

The kidneys were small and soft. Their tubular part was quite healthy, but the cortical portion was thin, and dotted everywhere with small, soft, white, cream-like deposits, which were ascertained by microscopic examination to contain cancer-cells. The ureters were healthy.

The bladder was raised much above its natural situation, but was perfectly healthy. Its mucous surface was pale, smooth, and perfectly healthy. It contained a third of a pint of turbid urine, with flakes in it. On examining with the microscope some which had been pressed out through the urethra after death, it was found to contain an abun-

dance of cancer-cells,—large irregular aggregations of spherical cells, caudate cells, and circular cells with one, six, or more sub-cells. Besides these there were epithelium scales, and single round globules or cells. The cells from the kidneys and those passed with the urine through the urethra were not alike.

The heart was rather large. The lungs were emphysematous, and did not collapse. The brain was in an advanced stage of atrophy, combined with serous compensation.

Behind either external iliac artery was a mass of enlarged glands affected with encephaloid cancer. That on the right side was comparatively small, situated within the pelvis, and still half an inch distant from the artery. The mass on the left side was situated on the edge of the pelvis, and formed a very large tumour, which had grown freely inward toward the mesial line, and externally had dislodged the psoas and iliacus muscles. The tumour was lodged in the bifurcation of the common iliac artery. The external iliac, girt at its origin above, and bound down by Poupart's ligament below, arched over the tumour, and was tightly stretched and flattened. The internal iliac beat against its posterior part, and the obturator ran beneath it to the thyroid foramen, so that except at the body of the pubes, the tumour was encircled in artery. Moreover, at the posterior and deeper parts the large gluteal, sciatic, and internal pudic arteries ran through the tumour in their way to the greater sciatic foramen. The whole tumour was enclosed in a dense capsule or fascia, which was particularly thick and adherent at its anterior part, and included the external iliac artery and vein in one mass with the tumour. At the soft and prominent lobes of the tumour the fascia had given way, and the growth protruded, yet it remained so tense as to retract considerably when divided in laying open the artery.

Enlarged white glands, yielding a creamy juice on section and pressure, were found in the loins and beneath the pleura. A few of the glands in the groins were partly filled with firm, and not creamy, malignant substance. These glands

were small and hard. The gland in front of the right external iliac artery was diseased.

There were small masses of malignant disease in different parts of the pelvis, some of which involved and raised the peritonæum. For the most part, however, they were arranged in the line of the absorbents, between the enlarged iliac glands and a central tumour situated between the bladder and rectum, and behind the prostate. It sprang out of the substance of the prostate; for that gland, though quite natural in size and form elsewhere, was at its posterior part identified with the growth; and a section of the two showed their tissue to be continuous. The prostate and tumour together were rather larger than a hen's egg. The left vesicula seminalis was included in the tumour; its walls were not distinguishable from the surrounding cancerous substance, but its cavity was not yet obliterated. The right vesicula seminalis was misshapen and thrust outward, except at its anterior extremity, which passed with the right vas deferens through the growth to the prostate. The interior of the tumour was divided by many thick fibrous bands into compartments which were filled with the softer cancerous deposit; and in one part a small round glossy calculus was found, similar to those which occur in the prostate. The section was partly of a pink colour and partly white. The prostatic portion of the urethra was capacious and healthy.

The left common iliac artery was about an inch and three-quarters in length; the ligature had been placed at about seven-eighths of an inch from either extremity of the vessel. The whole artery, was filled with coagulum from end to end.

The Transactions of the Society already contain a very comprehensive paper, contributed by Mr. Stanley, on the "Pulsating Tumours of Bone." And yet, even if the case above detailed had presented no additional features of practical importance, I should have ventured to recall the attention of the Fellows to the subject, the more especially

when I recollect that of the five cases in which the operation for the ligature of the common iliac artery has been performed in London, this constitutes the third in which the disease was supposed to be of aneurismal, but proved to be of malignant nature. The conditions which are stated by Mr. Stanley in his Paper to be requisite for the production of pulsation in a tumour, were here fulfilled. The tumour was bound down by a fascia, and adjoined a bone. But the sources of pulsation, in the present instance, were more abundant than in any previously recorded case. Systematic works contain rules for distinguishing a pulsating tumour above an artery, and a similar tumour beneath an artery; but no writer, so far as I am aware, has contemplated the necessity of distinguishing from aneurism a tumour receiving pulsation from one trunk on one side of it, from another trunk on another side, and from large branches within it at the same time. And, after having considered this case, I must confess myself unable to point out any plain and positive means of diagnosis, should such a tumour present itself again in a like situation, and in as critical a period of its existence, as in the eight days in which I had the opportunity of observing this. The distinction can be drawn only by the observation of other tumours, and of any characteristic state of the general health, if either exist. It is plain that the presence of any other tumour, and even of an altered gland in another part of the body, would merit an attention which the predominating influence and peculiar character of a vigorously pulsating tumour would go far to usurp; but I am not sure that the detection of a rounded tumour extending upward from the back of the prostate, would, in a man, aged fifty-three, have caused a suspicion that so rare a disease existed as primary cancer of the prostate gland—so rare, indeed, that Lebert denies its existence, and that the Hunterian Museum contains but a single specimen. The one means of distinguishing the disease, discovered in the present case, might (though a rare contingency) be useful in a future one. During life some urine was seen after it had been drawn off

through a catheter; it was quite clear, and no further examination was made of it. But that which was pressed out through the urethra after death was abundantly pervaded with cancer-cells. It is a matter of little practical importance whether these elements of the malignant disease were shed by the kidney or the prostate. It is, however, worthy of remark that microscopic examination of an excretion, though an unusual practice, might have the effect of determining the nature of a doubtful case, and preventing an operation, even though the symptoms presented should seem very positively to require one.



AN ACCOUNT OF A CASE  
OF  
BILIARY FISTULA.

BY  
GEORGE ROBINSON, M.D., NEWCASTLE-UPON-TYNE.

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Received June 8th—Read June 22d, 1852.

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Elizabeth Balmбра, æt. 64, the wife of a pitman, an active and generally healthy woman, the mother of seven children, had ceased to menstruate nineteen years since; and with the exception of occasional pains in the legs and lower part of the back, she continued to enjoy good health till within the last three years. She was then, for the first time, seized with pain in both sides extending to the epigastrium, of a paroxysmal character, each attack lasting about twenty minutes, and being preceded by rigors. During the intermission of the paroxysms, there was always more or less pain in the hypochondriac and epigastric regions, increased on pressure. For the relief of these symptoms, the surgeon in the colliery village where she then resided gave her bitters, taraxacum, and cod-liver oil, and applied blisters to the seat of pain; opium in full doses being both then and subsequently also administered during the paroxysms.

In the month of October, 1851, she came to reside at Dunston, near Gateshead, and became a patient of Mr. H. R. Stevenson, by whom my attention was afterwards directed to the case. She was then in a state of intense jaundice, the motions being white, the urine and skin deeply stained with bile, and the humours of the eye probably similarly tinged, as all objects appeared to her of a yellow colour. The rigors and subsequent paroxysms of pain were very frequent, and there was a hard tumour, of the size of

a man's fist, in the epigastric region, two or three inches above the umbilicus, with obscure swelling in both hypochondria. At no period of the disease was there any tendency to coma or delirium, nor was vomiting ever present, though at one time frequently solicited by copious draughts of warm water. The tumour gradually softened; exhibited fluctuation and pointing; and, by the commencement of January last, its cavity had so nearly approached the surface, the skin covering it being very thin and inflamed, that it was deemed advisable to relieve her sufferings by opening the abscess, which was done with a common lancet, and at least two quarts of a bright yellow, very offensive liquid, evidently a mixture of bile and pus, were discharged. The patient was at once relieved by the evacuation of the abscess; no constitutional disturbance followed, and she was placed on good diet, with beer, and cinchona. Under this treatment the discharge, which was at first very profuse and of an offensive smell, gradually diminished in quantity, and became clearer, thinner, of a green colour, and void of any offensive smell, in fact resembling in its physical properties pure bile; while the opening in the epigastrium made by the lancet also simultaneously contracted.

On the 18th of March, when I carefully examined her, she had so far recovered as to be able to walk about the house and attend to light domestic duties. Her chief complaint was of the discomfort occasioned by the constant flow of bile through the opening in the epigastrium, which completely saturated her linen and the cloths applied, and stained them of a deep saffron colour. The fistulous aperture was situated in the median line, two inches above the umbilicus, and was of the size of an ordinary goose-quill. A small stream of bile was constantly flowing through it, and when collected was very pure, but occasionally contained a very few flakes of pus. By means of a suitable glass retained over the opening, a considerable quantity of bile was collected, and an estimate formed of the average amount daily discharged, which we fixed at about eight fluid ounces. In order to place the nature of the fluid beyond doubt, I forwarded a

quantity, collected on two successive days, to Dr. Bence Jones, who pronounced it to be pure bile. The rate of discharge from the opening varied on different days, and the bile flowed most copiously when she was in an erect position; the flow was also more rapid after her meals, and was increased by straining or coughing. Her general health was at this time very good; her pulse 90; her appetite, which at first had been voracious, was now more moderate. With the exception of flatulence, she experienced no symptoms of indigestion: to use her own words, "She did not feel or know that she had a stomach." Like other persons in the same station, she generally lived upon milk and bread, with tea, fish, and occasionally meat. She had partaken of chicken and beef-steak without any inconvenience. The bowels were regular, acting once or twice daily. Within a week after the abscess was opened the jaundice had disappeared as regards the colour of the skin and urine, and surrounding objects no longer appeared to her of a yellowish colour, nor have these symptoms since returned. The intestinal evacuations, however, have never resumed the natural appearance, being still very light coloured and evidently destitute of bile. The right hypochondriac region was free from pain, but on pressure over the left side there was still a little tenderness, and around the fistulous orifice there was a distinct induration to the extent of an inch and a half. On drawing a very full inspiration, there was also a sense of pain about the epigastrium, as if from the stretching of the adherent parts.

After seeing this case a few times, I suddenly lost sight of the patient, about the end of March, in consequence of the male members of her family having found employment in another colliery, to which they had migrated: and, on ultimately discovering her new residence, on the 25th of May, I found her very much reduced in strength, but still presenting all the phenomena previously noticed in connection with the biliary fistula. The appearance of the orifice and the absolute quantity of bile discharged are the same, though from her constant recumbent posture, the rate of discharge in a given time is more variable than when she was erect.

She is at this time, June 4th, very much emaciated, which is partly due to the withdrawal of the beer, and the absence of adequate nourishment, though the biliary discharge doubtless adds to the debility.

A case somewhat analogous to this is mentioned by Dr. Heberden, in his Commentaries; and as its history seems to illustrate the pathology of the one just related, I may be permitted to extract the brief account which he gives of it.

"A woman, fifty years of age, was for ten days severely afflicted with pain of the stomach, hiccup, purging, and faintings, and with difficulty struggled through it. A month after there arose a swelling near the navel, which was opened, and discharged a great quantity of yellow fluid for the space of four years; at length the pain increased, together with sickness and shivering; and, after a few days there was discharged a gall-stone, three inches long and as much in circumference, weighing 245 grains. During the two following weeks a thin liquor was poured out in great abundance: soon after the sore healed up and the woman recovered." (4th ed., p. 210.)

The physiological interest attaching to this curious and rare termination of hepatic disease, will I hope justify my desire to place the foregoing case on record.

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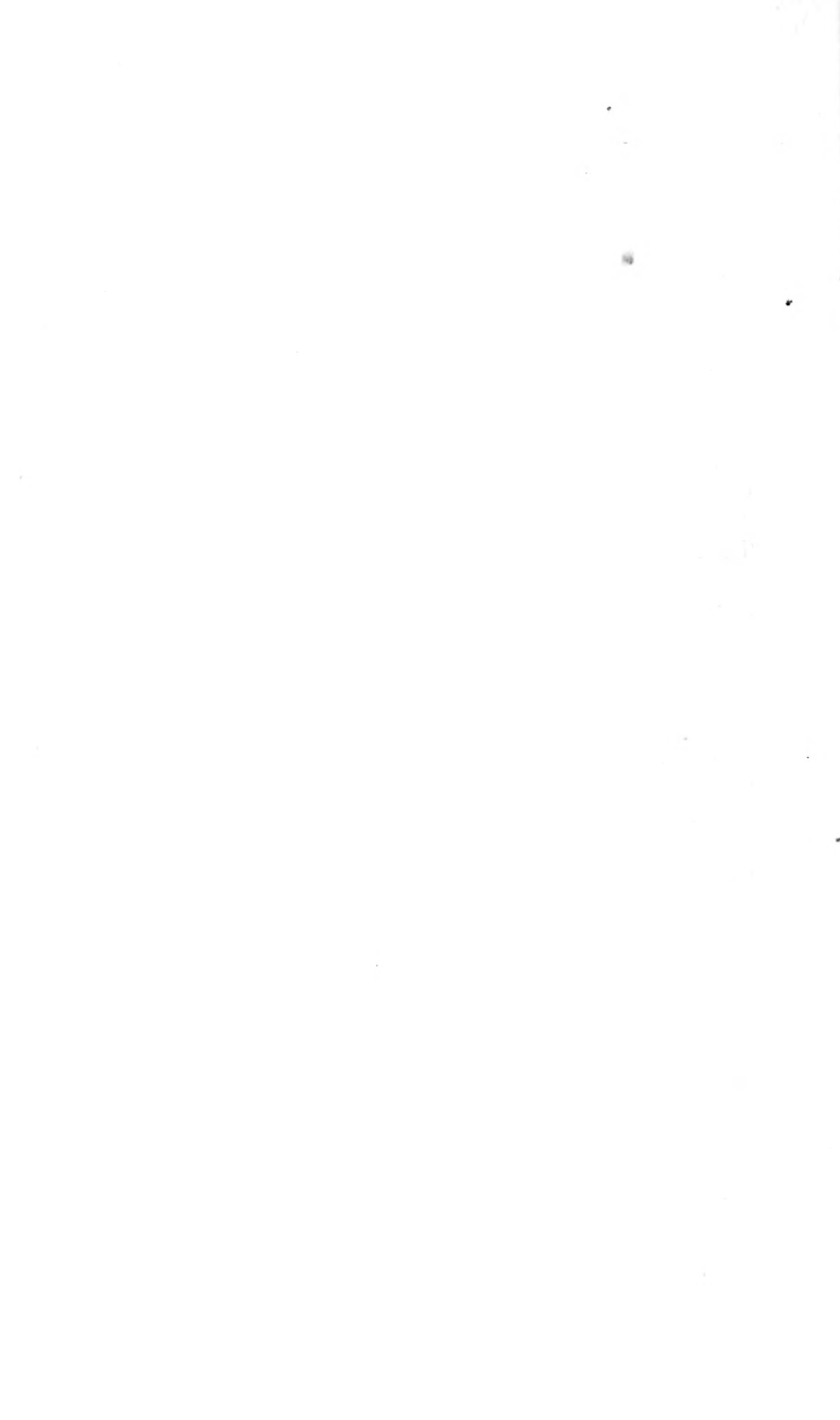
POSTSCRIPT, *Aug.* 14th, 1852.—The patient died on July 12th, and with some difficulty permission was obtained to examine the chief seat of disease. The liver was firmly adherent to all the surrounding structures, and its upper and anterior surface was attached by very strong adhesions to the abdominal parietes, at a point corresponding with the external fistulous orifice. The latter was found to communicate with one of the minor biliary ducts, all of which, however, were greatly dilated, as was the ductus hepaticus, which readily admitted the fore-finger. In the ductus communis choledochus, immediately below the junction of

the hepatic and cystic ducts, was imbedded a calculus of cylindrical form, convex at one end, and regularly concave at the other, the former being directed towards the hepatic, the latter towards the intestinal, extremity of the duct. This calculus, three fourths of an inch in length, and two thirds of an inch in its transverse diameter, was of a saffron colour, exhaled the peculiar smell of bile, and was evidently composed of that secretion in an inspissated state. The coats of the duct were tightly stretched upon it, and the obstruction to the flow of bile from the liver to the duodenum must have been complete. As the calculus was situated at a considerable distance from the fistulous opening in the epigastrium, a portion of the liver intervening, it is evident that any surgical exploration or enlargement of the orifice, which was at one time thought of, would have been worse than useless.

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#### SUPPLEMENTAL NOTE BY THE EDITOR.

Dr. Bence Jones has communicated to the Editor that he had received the calculus referred to in Dr. Robinson's paper on a case of biliary fistula, and that it consisted of inspissated bile, and that there must have been another in the gall-bladder.



# SUPPLEMENTAL NOTE

BY

MR. B. PHILLIPS.

SEQUEL TO A PAPER ON ENTEROTOMY, BY CROKER PENNELL,  
ESQ., CONTAINED IN THE THIRTY-THIRD VOLUME OF THE  
SOCIETY'S TRANSACTIONS.

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Read Feb. 24th, 1852.

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THE subject of the operation was Mr. G. G—; it was performed in November, 1849, and the present Paper is dated August 13, 1851, nearly twenty-two months afterwards. The report is as follows :

“For some months after the operation his health continued to improve steadily, and at the end of that time he had gained upwards of thirty pounds in weight. During that period the only ailment for which he consulted me was a slight biliary derangement.

“The next inconvenience from which he suffered was an attack of rheumatic gout, which appeared about six weeks ago, and has now nearly left him. Before the appearance of the stricture of the rectum he lived very freely, and indulged largely in vinous potations. The effects of these habits and the plethora which has followed the operation are probably the cause of his gout. In other respects he continues exceedingly well, and can perform all the functions of life with ease and comfort. A week ago he undertook the duties of manager of a very extensive and complicated banking establishment in the City.

“The artificial anus answers exceedingly well, the mucous membrane of the bowel having united to the skin through the greater part of the wound as evenly as the red margin of the lip joins the white. During the first month, and then only, the fæces, on two or three different occasions, passed into the lower part of the bowel and occasioned great suffering; and at that time, the urine escaping from the bladder into the bowel, made its appearance at the wound; a proof of the narrowness of the stricture.

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